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SENILE DEMENTIA—A NEW EXPLANATION OF ITS CAUSATION*

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DEMENTIA in the older age groups is now responsible for approximately one-third of all first admissions to mental hospitals, this high incidence, no doubt, reflecting the well-known relative increase in the number of older people in the general population. For each patient whose condition requires care in a mental hospital there must be several others who can be looked after at home as they become submerged to a greater or lesser degree in what Kinnear Wilson has called "the sea of mindlessness". The magnitude of the practical problem posed by this illness or group of illnesses needs no further emphasis. However, there is an equally important aspect which too often is neglected; I refer to the fact that here "Nature" is performing the most varied experiments, providing us with unique information concerning the organic substrate of a vast array of symptoms including defective memory, depression, hallucinations, delusions, paranoia, delirium, insomnia and anxiety. This rich mine of psychiatric data lies for the most part, unworked.

Many disease entities, including neurosyphilis, alcoholism, cranial trauma, Huntington's chorea, pernicious anaemia, tuberous sclerosis, multiple sclerosis, vitamin deficiency, hydrocephalus and drug addiction can be associated with dementia in older persons, but these are not under discussion in this paper. When cases of dementia with the above diagnoses have been excluded, there still remains the vast majority which are labelled arteriosclerotic dementia, senile dementia, presbyophrenia, Alzheimer's disease or Pick's disease. The clinical and pathological criteria for each of these diagnoses have re-

mained nebulous and confusing in spite of many excellent studies.

Mental deterioration following upon strokes, whether due to hæmorrhage, thrombosis or embolism, is usually classified as arteriosclerotic, without attempting any further distinction. When all cases with a history of stroke are separated out there is still left a large number in which deterioration has been slowly progressive and unmarked by a definite cerebrovascular accident. In this group, diagnosis is most difficult. If the dementia appears around the age of 50, Alzheimer's or Pick's disease is diagnosed although neither has specific clinical or pathological features. At a later age the diagnosis rests between cerebral arteriosclerosis and so-called senile dementia. Clinical distinctions between these two have been made on many occasions, but there are so many exceptions and so much overlapping, that it is problematical if any definite difference really exists.

From a pathological point of view the differential diagnosis may be just as difficult. Apart from the occurrence of convolitional atrophy, senile plaques or neurofibrillar changes in both, there is usually some cerebral arteriosclerosis in all cases with resultant difficulty in deciding how much of the entire picture is due to the arteriosclerosis and how much to such vague and unknown factors as abiotrophy. When vessel changes are minimal, senile dementia is diagnosed. When they are severe, arteriosclerotic dementia is favoured, while in the presence of moderate changes in the vessels, the dementia is suspected of being "mixed".

A recent pathological study of a case of severe senile dementia has uncovered a previously unsuspected lesion. At post-mortem examination virtually complete occlusion of the cervical portion of both internal carotid arteries was found, the intracranial cerebral vessels themselves being almost free of arteriosclerosis. The basilar artery and other collateral channels must have carried the entire blood supply to the brain. Had the carotid vessels not been examined, the dementia

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would certainly have been held to be "senile" in type. Since the patency of the cervical vessels carrying the major supply of blood to the brain has never before been considered as an etiological factor in the senile and presenile dementias, a preliminary report on this aspect is being made at this time. It is scarcely credible that in the extensive history of the study of this problem, the main arteries to the brain have never been completely examined.

Some 10 further cases of mild and severe dementia have since been studied clinically, and carotid disease, unilateral or bilateral, is suspected in each case.

CASE 1

This man was first admitted to hospital in January, 1947, at the age of 63, because of dermatitis of the legs. At that time, the patient could remember nothing. He did not know his age, his wife's name or her age. He did not know where he was and for the most part evaded direct questions by irrelevant talk. There was a speech impediment which made it difficult to understand him. From his wife it was learned that he had stopped working in 1937 at the age of 53 because he was too old to work. His wife noted nothing abnormal in his behaviour prior to 1945, when his memory became faulty. At no time did he have a stroke. He had had occasional attacks of dizziness and often complained of headache over the right eye. He gradually became more childish until he could no longer be allowed out of the house. He was prone to have sudden outbursts of anger without provocation but in 10 minutes or so the attack would pass off. On admission he appeared physically healthy, but moved slowly, and there was a coarse tremor of the hands. The reflexes were hyperactive but bilaterally equal. Sensation could not be tested accurately but seemed to be normal.

On general examination, there was little abnormal. The blood pressure was 168/88. There was a dermatitis of the legs between the knee and the ankle. Pulsation in the posterior tibial and dorsal pedal arteries was not "readily" felt. The blood Wassermann test was negative. The hemoglobin was 92%.

A psychiatric consultation note by Dr. R. C. Hamilton was as follows: "The patient is an old man sitting quietly in a chair. There are no remarkable mannerisms. Answers most questions in an irrelevant manner. No evidence of illusions, delusions or hallucinations. No emotional outbreaks during the interview. Memory is remarkably defective and this is the outstanding psychiatric feature. Completely disorientated as to time, place and person. Intelligence impossible to estimate, but very much impaired at present. Impression: Typical picture of an organic psychosis, probably senile dementia."

During the following year, the patient's condition deteriorated until he regularly soiled his clothing, no longer shaved himself and had to be dressed. He was at home and stayed awake at night, stumbling around the house, keeping other members of the family awake. Once he tried to choke his wife. On examination in August, 1948, when readmitted to hospital, he was physically well preserved. He was cheerful but completely dependent on the nursing staff. He was frequently incontinent of urine and faeces. The blood pressure was 180/94.

On March 29, 1949, he had a "fainting spell". He was discovered lying on the floor of his room by the nursing sister who could feel no pulse. Several minutes later he was his usual self, the pulse being regular and of good volume. On April 10, 1949, he had a similar attack in which he suddenly collapsed on the floor. Thirty minutes later, he was pale and perhaps a little more confused than usual, but he insisted on getting up.

The heart was regular and of normal rate. Neurological examination was not remarkable. Nicotinic acid was prescribed.

By October, 1949, further deterioration had occurred, but there had been no further "fainting" attacks. The blood pressure was 170/80. Slow deterioration continued and he finally spent the day sitting quietly in a chair. He was incontinent of bowel and bladder. He did not speak even when questioned. On January 24, 1951, he was found at 4.30 a.m. in a comatose condition. He responded only to painful stimuli. There was a flaccid paralysis of the right extremities. Pulsation in the left internal carotid artery was decreased. The blood pressure was 130/80 and the pulse 68. He became febrile the following day and coma deepened. The pupils were small, equal and reacted slightly to light. The tendon reflexes were diminished on the right. He began to vomit and died 48 hours after the onset of the stroke.

In summary, this patient after having progressive dementia for several years finally died of a nocturnal stroke. Just prior to death it was noted that pulsation was deficient in the left internal carotid artery. Earlier, the lack of pulses at the ankles had been found. The blood pressure was roughly 180/90.

The pathological diagnoses were: (1) bronchopneumonia; (2) coronary atherosclerosis.

Neuropathological findings.—There was a large, recent, disintegrating, pale softening involving the left hemisphere. It extended over the territory of the middle cerebral artery, but spared that of the anterior and posterior cerebral arteries. Upon section, the globus pallidus was involved, but the head of caudate and the thalamus were not. No ancient lesions, large or small were apparent. The brain stem was not remarkable, and the pons was not atrophic. There was little evidence of convolitional atrophy in the frontal polar areas. The brain weighed 1,320 grams. The ventricles were small and there were no herniations. An unusual finding was marked distension of the great anastomotic vein of Trolard on the right side, that is, opposite the softening. Microscopic study showed abundant senile plaques and extensive neurofibrillar changes of Alzheimer in many areas of the cortex, especially the frontal regions.

The cerebral vessels were almost free of atherosclerosis, a few plaques being located as shown in Fig. 1. The lumen was in no instance significantly narrowed. The stem of the left internal carotid artery was distended by dark red blood clot which extended into the middle cerebral artery to its first major bifurcation. The Circle of Willis is pictured in Fig. 1. The posterior communicating arteries were small and the anterior communicating was composed of several small vessels, none more than 0.75 mm. in diameter. The vertebral and basilar arteries

were unusually large.

The carotid arteries in the neck were examined in detail (Fig. 1). On the left side, the region of the bulb or sinus was completely occluded, three-fifths of the lumen being occupied by an eccentric yellow mass, the remaining two-fifths showing a firm white tissue in which a minute hole may have been present. The left internal carotid artery above the carotid bulb was firmly distended with dark red clot which extended upwards and was probably continuous with the clot found in the cerebral portion of the left internal carotid artery. The wall of the internal carotid artery above the bulb was normal.

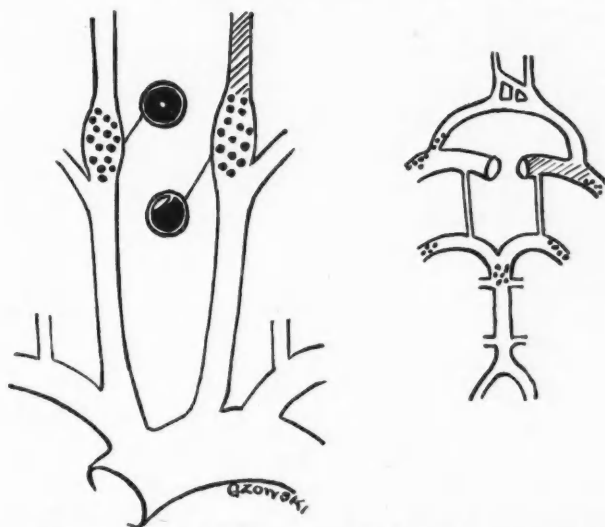


Fig. 1.—Drawing of the chief findings within the carotid arteries. The stippled areas represent atherosclerosis, the hatched area represents fresh blood clot. The Circle of Willis is drawn to scale. The black circular areas are cross-section views of the artery.

The right internal carotid artery in the region of the bulb was almost occluded by a symmetrical yellowish layer, at one edge of which a thin lumen 0.5 mm. in diameter was seen. Above the bulb the artery was normal. Both common carotid arteries were large and patent, including their origin from the innominate artery and aorta respectively. The mouths of the external carotid arteries were slightly narrowed by atherosclerotic deposits, but not to an important degree.

Summary.—This patient after having progressive senile dementia for several years, finally died due to a recent thrombosis of the left internal carotid artery. Both internal carotid arteries showed old atherosclerotic occlusion strictly localized to the carotid sinus. It is postulated that chronic cerebral ischaemia due to blockage of the carotid arteries caused the progressive cerebral deterioration. Attacks of un-

consciousness or fainting, which are not uncommon in elderly demented, occurred on two occasions. The absence of pulses at the ankles should prove to be characteristic. Both posterior communicating arteries were small, so that blood must have passed through small collateral channels to reach the territory of the internal carotid arteries. The presence of a coarse tremor of the hands coupled with slowness of gait is a common part of the picture in senile dementia.

The following two cases are examples of senile dementia in which carotid disease is strongly suggested on clinical grounds.

CASE 2

Male, aged 74. Patient was admitted in July, 1948, at the age of 71. From his family it was learned that for a few years he had been a "difficult character", hard to please, impatient, restless and irritable. He would tear his clothes for no reason and was careless about throwing matches away after lighting his pipe. The neighbours were frightened of him and the family sometimes thought he was insane.

The patient himself complained of weakness of the arms, stiffness of all limbs, and a mild tremor of the right hand. Walking was difficult and sometimes on the street attacks of uncontrollable running came on in which he would stop only when he bumped into some object. He also complained of right-sided headache, a burning feeling in both feet and dyspnoea on exertion.

On examination he was well developed, well nourished and of good colour. The face bore a fixed expression. There was difficulty in gazing upwards and possibly bilateral ptosis. The patient moved about slowly with tiny steps. There was rigidity of all limbs. The tendon reflexes were sluggish but equal and the plantar response was downwards. Vibration sense was normal. The blood pressure was 190/90, and there was normal sinus cardiac rhythm. The blood Kahn was negative.

In hospital he was unhappy, restless, depressed and said he would go crazy if kept in. In July, 1948, hyoscine was prescribed because of the rigidity of the limbs, but the patient became excited, and for several days had hallucinations, delusions and constantly talked nonsense. This reaction subsided but he continued to have bouts of unusual behaviour. In January, 1949, he said he had heard his wife speaking to him, that he was detained from leaving the hospital by rifle-carrying guards and also claimed that his wife spent the night washing paint off houses in a nearby village. In the following months he was frequently disorientated in time and place, particularly at night when he would become indignant at imaginary wrongs and use abusive language.

By mid-1950 his face was expressionless and he had a characteristic stooped posture and shuffling short-step gait. All movements were slow and deliberate. The limbs displayed "lead-pipe" rigidity.

Examination in February, 1951, showed little change. He walked slowly with shuffling, six inch steps, the toes turned in, and the body stooped. The voice was monotonous. All limbs showed rigidity, the right more than the left. The pupils were equal and reacted to light. There was no facial weakness. The tendon reflexes were normal and the plantar responses downwards. Vibration was appreciated at the mid tarsus.

He thought he had been in hospital about a year and wanted to get out and "get active again". He did not know his age but knew where he was.

Pulsation in the left internal carotid was absent, while in the right it was much reduced but probably present. Pulsation was absent in both posterior tibial and dorsalis pedis arteries. The blood pressure was 180/100. There was a loud basal cardiac murmur maximum beneath the mid-clavicle on the right side. A striking pulsation within

the scalp could be felt by placing the palms of the hands on the head.

In summary, this patient showed several psychiatric symptoms including loss of memory, carelessness, outbursts of temper, hallucinations and some paranoid ideas. Widespread muscular rigidity was present but tremor was not prominent. The patient behaved badly at night and reacted adversely to small doses of hyoscine. The left internal carotid artery was pulseless and the muscular rigidity was more marked on the right. Pulsation at the ankles was absent. A curious finding was an easily palpable pulsation in many areas of the scalp.

CASE 3

Male, aged 83. This patient had been in hospital in 1944 at the age of 76 because of a hernia. At that time it was remarked that he was mentally clear. The blood pressure was 165/85.

He was re-admitted in May, 1950, because of loss of memory and confusion. General examination was not remarkable. The blood pressure was 184/84. Neurological examination was within normal limits. He was disoriented in time, place and person. A psychiatric consultation (Dr. R. H. Angrove) was as follows: "The patient is friendly and agreeable. He gives his age as 78 (83) and the year as 1916. He has been giving away his money on the ward. He is disoriented and confused." The diagnostic impression was senile dementia. During the following months, the patient frequently prowled around all night, rummaging in lockers and getting into the wrong bed several times a night.

In February, 1951, examination showed a small, well developed, well nourished elderly man, who still walked with considerable briskness. He said he did not know the year, but it might be 1975 or 1980. He gave his age as 78. The pupils were equal and reacted to light. All teeth had been removed. Hearing was good. Speech and swallowing were normal. Rapid fine movements were performed poorly, but there was no paralysis, rigidity or tremor. The tendon reflexes were normal except for absence of the ankle jerks. The plantar responses were downwards. Vibration sense was decreased in the lower extremities.

Pulsation in both internal carotid arteries was absent. Likewise no pulse was felt in the dorsalis pedis and posterior tibial arteries of either side. The blood Wassermann was negative. The electrocardiogram showed definite abnormalities. There was no history of alcoholism.

This patient appears to have bilateral carotid occlusion, but this has not been confirmed. The absence of rigidity and the brisk gait were notable features. Again, the pulses at the ankles were absent.

DISCUSSION

From the data presented in Case 1, there is no doubt that carotid occlusion can be associated with senile dementia. To assign it a causative rôle requires much further work both in cases of dementia and in controls. Arteriography will certainly help but it will not provide the critical data which can come only

through clinico-pathological studies. As controls, I have examined pathologically the carotid vessels in 30 elderly patients without dementia, and found none occluded. This, of course, is an insufficient number, but so far the results are not contradictory.

According to Frovig bilateral carotid occlusion has been reported only ten times in the past 100 years. Of these cases only a few were well studied and in none was dementia mentioned except following a cerebrovascular accident. Also in these previously reported cases the carotid occlusion was usually secondary to disease of the aortic arch. Apparently, this is the first instance in which bilateral occlusion within the carotid bulb has been described.

To generalize from one case is dangerous but at present I am inclined to believe that the clinical picture in Case 1 was directly due to a prolonged mild but significant cerebral ischaemia. The resultant symptoms and signs were very much different to what would be anticipated from a consideration of the deficits seen in acute severe ischaemia, and it would be an important advance if chronic cerebral ischaemia should prove capable of causing the vast array of manifestations associated with senile dementia. Kety² has reported a 25% decrease in the cerebral blood flow in senile dementia but the clinical and pathological data relating to his cases have not been published so far. The doctrine of impaired cerebral oxygenation acting over a period of years has not been clearly stated in the past and if it is true, each plaque of cerebral atherosclerosis will be suspect until proved otherwise, although blood flow is determined largely by the lumen remaining at the site of the greatest obstruction on the largest vessel of supply.

Should the present thesis prove to be correct, many well-recognized features of senile dementia will find a ready explanation. As just mentioned Kety has found a decreased cerebral blood flow in senile dementia, but if only the cerebral vessels are examined at necropsy, the anatomical basis for this is often not apparent. Carotid occlusion would provide an adequate cause for this diminution in blood flow. The selective involvement of the frontal and anterior temporal regions in senile atrophy, so far completely unexplained, would be the logical sequence of an inadequate blood supply to the chief territory of the internal carotid

artery. One of the unsolved puzzles of senile changes in the brain has been the fact that an identical psychiatric picture on one occasion is associated with atherosclerosis of the cerebral vessels and on another, with vessels that are almost normal. It is likely that atherosclerotic occlusion has not been sought for in the proper vessels, namely, the carotid channels left behind, when the brain is removed. In Case 1 the cerebral vessels showed very little atherosclerosis although the carotids were occluded, and it is tentatively suggested that partial occlusion within the carotid bulb, by lowering the pressure in the internal carotid artery distally, may well prevent atherosclerotic deposits on cerebral vessels.

It is well known that cases of senile dementia are particularly prone to transient attacks of faintness, weakness, unconsciousness, headache, confusion or unusual behaviour. These might be explained by changes of blood flow in the basilar or other collateral systems; in other words, according to the present theory, there is easily provided for these symptoms a vascular basis which has heretofore proved elusive. A cursory study of my present pathological material suggests that carotid occlusion may in part explain the onset of psychosis in cases of cardiac failure when clear-cut cerebral atherosclerosis is absent.

That the carotid occlusion need not be bilateral is suggested by my examination of some 10 other cases of senile dementia. Frequently the pulsation in one internal carotid artery only was absent, and that usually the left. The clinical impression that left-sided occlusion might be of particular importance is supported by three previous case reports. Shimidzu⁷ in his paper on the diagnostic value of carotid arteriography added to his series of cases of brain tumour, etc., two supplementary cases, the first of which may have an important bearing on the present subject.

The case was that of a man who died at the age of 60, after a 10 year progressive dementia which began with defective memory, depression, sleeplessness, amoral behaviour, loss of initiative and hallucinations. Two years before death, examination showed a demented, disoriented man with indistinct speech who at times talked to himself and laughed emptily. The facies was mask-like. The blood pressure was 140 systolic. One year before death, he showed stereotyped behaviour, apraxia, logorhoea, echolalia and dirtiness. An arteriogram made at this time showed occlusion of the left internal carotid artery at its origin. Injection of the contrast-medium into the right carotid, produced questionable filling of the middle cerebral artery of the opposite side. A pneumoencephalogram showed atrophy especially of the left

fronto-temporal region. It was also remarked that the left side of the face was hypertrophied, presumably because of increased blood flow through the external carotid artery. The diagnosis prior to arteriography had been Pick's disease. The patient became totally demented spending his last days just lying in bed. An autopsy was not performed.

This important case lends strong support to my entire thesis, and in addition brings the problem of presenile dementia within the concept.

Riechert⁸ (1938) presented three cases of occlusion of the internal carotid artery, the second of which concerned a man who was admitted to hospital because of attempted suicide by slashing his wrist. He gave a history of mental depression and of weakness and paraesthesia of the left foot. The blood pressure was 145/95. On examination, the only abnormality was weakness and spasticity of the left lower extremity. Mentally he was depressed, inattentive and slightly disoriented in time. A pneumoencephalogram showed enlargement of the left ventricle and an arteriogram demonstrated a complete block of the left internal carotid artery at its origin. Right-sided arteriography resulted in filling of the vessels of both hemispheres.

This is then another case of occlusion of the left internal carotid artery associated with depression and dementia.

Case 2 of Penzoldt⁹ was that of a man aged 43 who had been in a mental hospital for three years. First he had shown depression and diminished intelligence which later progressed to uncleanliness and complete dementia. The diagnosis was "general paralysis". He died two days after suddenly collapsing. Postmortem examination showed an anomalous left common carotid artery arising from the innominate artery, and completely occluded at its origin by a dark gray clot. The region of the left basal ganglia was softened.

These three cases furnish strong additional evidence that unilateral occlusion of the internal carotid, particularly the left, may be causally related to dementia. Whether disease of the left carotid artery is just more common, or whether ischaemia of the dominant hemisphere is the important factor, is at present not clear. That chronic impairment of the nutrition of the dominant hemisphere should produce a mental abnormality qualitatively different from that of involvement of the non-dominant hemisphere, is not in accord with the majority of conclusions concerning the relative importance of each frontal lobe, and only further observation will clear up this extremely important point. Patients in whom one carotid artery has been surgically ligated without immediate ill-effects, should be re-examined after a long period of time to see if any trace of mental change not attributable to the original disease has made its appearance. The absence of such change of course may only mean that the col-

lateral flow from side to side and from basilar to carotid is unusually good.

In a previous paper³ I have pointed out that carotid occlusion is far from a rarity and that a stroke is often found associated with it. Hultquist⁴ had previously emphasized, in a pathological study, the great frequency of thrombo-embolic disease of the carotid arteries. There is agreement that the pathological basis of occlusion of the internal carotid artery is atherosclerosis and its special site of predilection is the region of the carotid bulb or sinus. Indeed, the carotid bulb shows an atherosclerotic change equal to that of the abdominal aorta, both in incidence and severity. Keele⁵ found changes in the carotid sinus in 50 of 55 unselected cases and Hasselbach⁶ in 69 of 72 cases. Serious atheromatous deposit in the carotid bulb is not uncommon in the 30's and 40's, but reaches its peak around 60 or 70. Hultquist found carotid occlusion to be one-third as common in the intracranial portion just distal to the ophthalmic artery. I have not been able to confirm this point, chiefly because this region is usually cut with a scissors at post-mortem examination, the vessel being crushed so that its previous patency is difficult to judge. Further observations must be made to clarify the matter.

The diagnosis of carotid occlusion can often be made through the absence of pulsation on palpation of the internal carotid artery but there are many borderline cases in which the pulsation in branches of the external carotid precludes an exact opinion. Also, if the occlusion is in the region of the ophthalmic artery palpation will be of no value. If the external carotid artery is also occluded, pulsation in the superficial temporal artery may be lost. Carotid arteriography is the only way of making a diagnosis in life, but the procedure is not absolutely safe in the presence of diseased vessels and for that reason arteriograms have not been made in the author's patients so far. Should further pathological study prove fruitful, this method of investigation will be used. In addition to carotid disease, there are usually signs of widespread atherosclerosis, such as angina pectoris, cardiac infarction, cold feet, absent pulses in the lower extremities and even peripheral gangrene. It is remarkable the number of cases of senile dementia in which pulses at the ankles are absent. Severe diastolic hyper-

tension is usually absent, although the systolic pressure can be raised. The clinical diagnosis of carotid occlusion is largely a matter of keeping the possibility in mind.

THERAPEUTIC CONSIDERATIONS

The present-day therapy of senile dementia is most disheartening. Should the present proposition be substantiated, there might be some basis for trying to improve the blood supply to the brain by vasodilating agents or by "stellate blocks", the collateral channels being relaxed by these measures. However, there is no evidence that dilatation of collateral channels would be effective where closure of the carotid has existed for months or years. A most interesting speculation relates to the surgical aspect of the problem. It is a remarkable fact that the internal carotid artery above the bulb is almost invariably normal, never showing the slightest atherosclerotic change although only a few centimeters removed from the severely damaged region of the bulb. The external carotid artery too is usually patent, so that anastomosis of the external carotid artery or its branches, to the normal portion of the internal carotid artery should prove feasible. Whether improvement would take place cannot be answered now, but prevention of progress of the cerebral process should be expected. Further speculation on this matter at present is unwarranted.

SUMMARY

1. A case of senile dementia associated with proved bilateral occlusion of the internal carotid artery has been presented.

2. Several further cases have been studied clinically with evidence of serious carotid disease in all cases.

3. It has been suggested that some cases of senile and perhaps of presenile dementia are determined by a chronic cerebral ischaemia due to occlusion of one or both carotid channels. Such a blockage would explain many pathological features of the disease.

4. Disease or occlusion of the internal carotid artery within the bulb is extremely common, and is due to atherosclerosis. Other evidences of atherosclerosis are found regularly in association with senile dementia.

5. The present theory has important therapeutic implications, for the disease would be open to surgical attack. Anastomosis should be

feasible in the cervical portion of the internal carotid artery.

6. Carotid occlusion may provide the basis for a unitarian concept of some of the variegated mental disturbances of old age. It may help to explain senile muscular rigidity as in Case 2 and the coarse tremor of old age as in Case 1.

7. There is some evidence that occlusion of the left internal carotid artery, the main supply

of the dominant hemisphere, is especially related to the development of dementia.

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PREVENTIVE PROCEDURES IN GENERAL PRACTICE*

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THE socialization of medical services in other countries and the possible spread of that trend to this continent are among the favourite subjects of our news and editorial writers in the lay press. Our popular magazines feature articles, by supposed authorities, alternately damning and praising to the skies the results of state controlled medicine in other countries. Our own professional journals are using much space to show that the patient, the physician and the country as a whole will suffer if the state takes over the direction of our efforts. If this matter is worthy of the attention it is receiving there must be some good hot fire behind all the smoke. If the danger of socialization be real, there must be sound cause for this present situation and it would seem reasonable that we, as physicians, should look into the matter and see where we may stop this trend, not only for the benefit of the patient and the country but also, from purely selfish motives, to be of service to our own profession and to ourselves.

Lest I be accused of bias in the matter, let me make my own position perfectly clear. I am first and foremost a physician. I am proud to be a member of that profession and I am genuinely interested in the welfare of that calling. I feel that we have privileges as physicians but I feel also that no other profession

lays upon its members greater obligations. It is not enough to be in medicine to make a living, one must be imbued with a spirit of service or he is a misfit. By my own choice, I am a health officer and not now in the family practice of medicine but I am convinced that the family physician is still the key person in the practice of medicine in this and in every other country. If he does not adequately fulfill his rôle, then, the whole structure of the profession is weakened. If the family physician is solidly established and gives the service needed and expected by his patients, the rest of the profession need have little worry.

THE PROBLEM

At the annual meeting of the Canadian Medical Association in Halifax in 1950 the Honourable Paul Martin, Minister of National Health and Welfare, made some very significant observations. I would like to quote from his speech:

"It has become more and more a matter of concern to me that government health departments have had to provide so much personal health service for individuals in the community. As I see it, in order to conserve medical and nursing personnel and to provide better services, it will be necessary to place some of the work that is now being done by the full-time health agency in the hands of those to whom it properly belongs, the family physician. I refer particularly to pre-natal and post-natal care, immunization, well-baby clinics, and, in many instances, the medical examinations in the organization and operation of school medical services."

I think that statement can well serve as a frame work for my remarks and very concisely states the problem we face today.

As a health officer, you might feel that I would be in complete opposition to Mr. Martin's remarks. Nothing could be further from the truth; I completely agree with him. Even if all

* Presented before the Executive of the Section of General Practice, Canadian Medical Association, Royal York Hotel, Toronto, February 28, 1951.

these activities were the responsibility of the family physician the health officer would still be a busy man. If he were free of these tasks he would have some time to devote to the new problems that press upon him. Think of some of the problems for which he now has no time, poor housing, chronic alcoholism, accident prevention, the problems of the aged, mental health and a host of others. No thinking health officer need fear that he will be out of a job if the family physician were to assume all the obligations Mr. Martin has indicated.

How did these matters slip out of the hands of the family physician and become activities of the government supported health department? The answer is not simple; there are probably many factors involved. Certainly, one cannot discount the economic aspect. A program supported by taxes spreads the cost over many people and makes the service to the individual less costly. Such services were originally intended for the medically indigent portion of the population but, gradually, as in other tax supported activities, all taxpayers felt they had an equal right to the services. This leads naturally into the second reason for the vast growth of these health department activities. They have grown because of public demand. The public is health conscious, it is preventive medicine minded. The teaching in schools, the press, the radio and many other media have combined to impress upon our people the dramatic results that may be obtained by the utilization of the services that preventive medicine has to offer. They see the epidemic diseases disappearing, their babies blooming and life in general made more pleasant by the efforts of preventive medicine. The public are not fools, they know a good thing when they see it and they make full use of it.

Has the family physician taken full advantage of this interest of the public in preventive medicine? Has he used it to prevent socialization of his profession? Has he utilized it as a builder of his own practice? Much as I dislike to say it, I think, in all honesty, I must answer in the negative to all these questions. The obvious rejoinder is that the health department is tax-supported and that his patients use those facilities rather than pay the individual physician. This is only a small part of the reason. Many a physician practising in Canada today is primarily interested in the ill patient and gives little or no thought to the person who has no

apparent illness. It would be foolhardy to suggest that his interest should be less in the ill patient but he should be more concerned about the apparently well members of his practice. The preamble to the constitution of the World Health Organization states: "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity". On that basis we, as physicians, have not discharged our obligations to our patients if we merely treat them when they are acutely ill. No other member of the community has the potential power, authority or respect the doctor enjoys. His word of advice carries more weight than that of any other man; he is closer to more people in his community. He is respected, admired and loved by his people. Then, I submit he should use his great potentialities to the full.

The family physician need not fear the financial aspects of the employment of preventive procedures in his practice. His patients, if educated to the need, are willing to accept the services and, in most cases, to pay for them. When a high governmental authority of the calibre of Mr. Martin states that preventive procedures should be back in the hands of the private physician it is obvious that the government would expect the family physician to be paid for these services. The inference is that the government, probably through the official health agency, would expect financially to subsidize these benefits. However, if the family physician accepted a subsidization he would automatically assume an obligation for quality of service. The work done by him would have to equal in quality that now being done by the official health agency.

It is doubtful that governments, whether they be local, provincial or federal, are likely suddenly to transfer all preventive procedures back to the hands of the family physician. It will have to be a gradual evolution whereby the medical profession, by its own efforts, will demonstrate to the authorities that it is now ready and willing to accept those responsibilities that have reposed for so long in official hands. Practically all legislation is enacted by the wishes of the majority. When enough people want something then governments pass the necessary legislation. We may never reach the happy day Mr. Martin has envisioned, but even if we do not, we will have accomplished two objectives which are most desirable. Firstly, by the proper practice of pre-

ventive medicine by the family physician, the people of Canada will be healthier and happier. Secondly, the family physician will have strengthened his place in his community and, by that personal gain, he will have benefited the profession as a whole.

One could make a long list of the preventive procedures that are readily available to the family physician in his practice. However, our purpose would be better served if we considered the broad aspects of the utilization of preventive medicine by the general practitioner. The details of the procedures are readily available to all; it is much more vital to realize their fundamental importance.

PRE-NATAL AND POST-NATAL CARE

As a beginning, let us look again at Mr. Martin's statement. He feels that pre-natal and post-natal care, immunization, well-baby clinics and school medical examinations should be done by the family physician.

Except in larger centres, pre- and post-natal care have been pretty well left in the hands of the family physician. In the rural areas the efforts of the health department have been largely confined to the field of education, with the public health nurse taking the leading rôle. One of her major tasks has been to impress upon the mother the need for adequate pre-natal and post-natal care by her own physician. Too often, when the nurse, by considerable effort, has convinced the mother she should see her doctor her efforts are rendered futile by the physician who shows little or no interest in the preventive effort. It is not suggested that this invariably happens, but it does occur often enough to cause concern. No other group is more eager for helpful advice, no other group is so willing to co-operate. The reception the public health nurse receives from these women is ample evidence that the average expectant mother is keenly interested in the welfare, not only of herself, but also, that of her unborn child.

It is a great pity if this opportunity is not used to the full by the physician. If it is not, then, it is only reasonable to expect to see a spread of the pre-natal and post-natal clinics from the urban to the rural areas. It is a source of satisfaction to us all that fewer mothers and babies die each year in Canada. However, the drop in infant and maternal mortality is only one aspect of the solution of the problem. The

prevention of morbidity, the provision of mental security and the education of the expectant mother by the giving of sound pre-natal and post-natal care are equally important.

IMMUNIZATION

We have had such great success in Canada with certain immunization measures that we tend to become complacent and to ignore the potential danger that is still present. The use of vaccination against smallpox and toxoid against diphtheria has been so successful that we forget that it is only because of these measures that these diseases have been almost completely controlled. During the last war we found that many recruits had not been vaccinated, and children still arrive at school without having had these procedures done. Some of this is due to parental ignorance and apathy. However, it is found that when the reasons for immunization are explained to the parents, consent is almost always forthcoming. Part of the blame must be laid at the door of the practising physician. Many physicians dislike doing immunization. There is a tendency to leave it until it is done by the health department. This is an unfortunate situation. Here we have proved preventive measures, let us use them to the full.

If the family physician so desires, he can sell the value of immunization to his patients. Most of them would prefer to have these procedures done by him rather than in a health department clinic. However, if this immunization is not provided by the family physician, the health department will have to continue its own intensive effort since the prevention of communicable disease is surely a basic duty of the official health agency.

WELL-BABY CARE

Well-baby clinics have shown a phenomenal growth in recent years in most sections of Canada. Their popularity is evidence of a demand from the public. Why are they so popular? The mother of the new baby is eager to learn, eager to have her questions answered, wants to do the best for her child. From the press, from excellent educational pamphlets and textbooks, from the radio and from many other sources she has had impressed upon her the desirability of well-baby care. In the clinic she finds a friendly helpful atmosphere, nurses and physician ready to answer her questions, and she sees her baby showing the beneficial

results of well-baby care. In short, most mothers are very pleased by the service rendered to them by the well-baby clinic.

Why do these mothers not seek the same sort of service from the family physician? Many of them do and most receive excellent care. Unfortunately some do not receive the care they expect, the care they deserve. Some wait for long periods in the waiting room and, when finally received by the physician, are discouraged by his lack of interest in the well baby. The questions which are important to her are apparently absurd and trivial to him. Granted, the family physician is a very busy man, but, if as Mr. Martin says, well-baby care belongs in the office of the family physician, then, it follows that he must provide equally good service to that now rendered by the official health agency. There are devices that the busy physician may employ to provide this care. Some physicians include in the obstetrical fee a well-baby service for a stated period, others set aside certain afternoons for well-baby clinics for their patients. The well-baby service is valuable and is here to stay. Whether it is to be provided by the family physician or by the official health agency will, in some degree, depend upon the practising physician himself.

SCHOOL MEDICAL SERVICES

Mr. Martin speaks of school medical examinations being a possible field for the family physician. It is obvious that he recognizes that medical examinations in schools are only a part of the total health service rendered to schools by the health agency. Most health departments attempt to utilize, as much as possible, the services of family physicians in medical examinations of school children. In some instances, in the pre-school roundup, the parent is asked to have the child examined by the family physician in his own office just prior to his beginning school. Many health departments use family physicians on a part-time basis in the schools but the results from these efforts are not invariably or uniformly successful. Too often, the physician gives to the school work less attention that it rightfully deserves. The examination of the school child is primarily a teaching experience for the parent and the child. The physical findings are important but more important is the chance to impress upon the mother and the child the simple rules for

healthful living and normal development.

If the physician is not willing to spend a few extra minutes in this educational effort, then, the time spent on the routine examination is largely wasted. Most health officers would welcome the greater participation of the family physician in the school medical program but only if he is willing to include health teaching with his physical examination.

MENTAL HEALTH

There is a large group of patients in every general practice for whom preventive medicine is vital. These are the people with no physical basis for their complaints. Their ills are very real to them; the origin of their symptoms is purely functional. No one is in a better position to help them than is the family physician. He has their confidence, he can offer them real hope. Their chief need is for a sympathetic listener upon whom they can unload their troubles. Most of them, by skilful handling, can be restored to better health. The number of charlatans and unorthodox non-medical practitioners in this country is visible evidence that these unfortunate people do not always receive the care they deserve from the physician. This group offers a real opportunity for the practice of one of the most valuable fields of preventive medicine, that of mental health.

PERIODIC EXAMINATIONS

When large business organizations are willing to pay physicians for the routine physical examination of their employees it is obvious that such examinations are worth doing. When an insurance company will pay for annual examination of its policy holders, it must expect that the results will save it money. It expects these examinations will reveal defects whose early detection will prevent disability or death. If these examinations are of proved value in industry and in business, should they not be used in general practice? Think of some of the conditions which may be unearthed in a routine physical examination in a physician's office; cardiovascular and renal disease in the earliest stages, many forms of new growth, diabetes, early symptoms of psychiatric disorders and a host of others. All of these may be found in patients who, as yet, have so few signs or symptoms that they have not considered visiting the physician because of illness. It would be easy for the physician, through an educational pro-

cess, to convince his patients in the middle and older age groups that regular physical examinations are most important. If this were accomplished, not only would the patient benefit but it would be of ultimate advantage to the physician himself.

SUMMARY AND CONCLUSIONS

There are many opportunities for the employment of preventive procedures by the family physician in his day by day practice. These procedures are an integral and important part of any general practice. With the vast strides that have been made in preventive medicine in recent years, the family physician has available to him potent weapons to prevent disease before it occurs or to detect it in its earliest stages. It is not enough to treat the patient after the disease has become established.

In some degree, it is a matter of attitude. Not too many years ago the teaching of preventive and clinical medicine was completely separated. Now, in the better medical schools, the integration between the departments of preventive and clinical instruction is being developed and expanded. It is hoped that the graduate will go out into practice with a preventive attitude and an appreciation of what this aspect of medicine

can do both for his patients and himself.

The physician in the health agency and the physician in general practice have the same ultimate aim, to give the best medical service to the people in their community. Health department activities have grown because of a need in the community and a demand from the people for these services. It is granted that many of the services now rendered by the official health agency should be in the hands of the family physician. How they slipped away from the general practitioner is a matter for speculation; it is much more important to consider how he may again assume these responsibilities. There can be no question but that the demand for these services will increase. If the family physician wishes to participate in these activities he must be prepared to practise preventive medicine in all its manifold aspects. If he is not willing to do this the official health agency must assume the burden because, in the light of our present day knowledge, it is the sound way to health.

If the family physician will wholeheartedly participate in the practice of the principles of preventive medicine he will, in large measure, prevent the socialization of medical services in this country. The family physician is the key in the whole profession; by his efforts he can control not only his future but the future of us all.

CARDIOVASCULAR EFFECTS OF TRIETHANOLAMINE TRINITRATE— AN EXPERIMENTAL STUDY*

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TRIETHANOLAMINE trinitrate— $N(\text{CH}_2\text{CH}_2\text{O.NO}_2)_3$ —was first prepared and studied by Junkmann¹ in Germany, and has been suggested as a possible substitute for other nitrites and nitrates in the treatment of angina pectoris.^{2, 3}

Apart from the original observations of Junkmann, the only other laboratory studies on the drug that we have been able to find in the literature, are those by Bovet and Nitti-Bovet⁴ who showed that, when injected intravenously

in anesthetized dogs, triethanolamine trinitrate (in alcoholic solution) produces considerably less depressor effect than nitroglycerin. However, by recording simultaneously the blood pressure and the changes in nasal mucous membrane volume (using a plethysmographic method), it was observed by these workers that after injection of a small dose (0.1 mgm. per kg.), which produces no change in the blood pressure level, there is a marked and prolonged dilatation of the vessels of the nasal mucosa. In other experiments, however, it was shown that a large dose (10 mgm. per kg.) when injected subcutaneously, produces a prolonged (4 hours) depressor response.

In connection with the clinical studies being reported by Palmer and Ramsey in the succeeding paper, and in view of the above observations it appeared of sufficient interest to report some observations which were made in this laboratory concerning certain phases of the

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pharmacology of triethanolamine trinitrate. These studies were done in the course of previously published experiments⁵ in which a number of other coronary vasodilator agents (aminophylline, nitroglycerin and papaverine) were tested and compared, using a new method for the evaluation of coronary drugs, as recently described.⁶

1. Effects of triethanolamine trinitrate on coronary flow and heart action.

METHODS

The isolated rabbit heart perfused with oxygenated Locke's solution was used. The perfusion technique employed, has been fully described elsewhere⁶ and the reader is referred to that paper for details. In a general way, the procedure permits recording on a kymograph the changes occurring simultaneously in coronary inflow and in heart contractions. The advantage of this technique is that it permits correlating these changes, and thus determining to a large extent whether changes in the rate of coronary flow produced by a drug are due mainly to its effect on the coronary vessels *per se* or to associated changes in the heart contractions.

The figures show sections of records obtained in such experiments, and in each case the tracings represent from above down: (1) Time (T), at 10 second intervals. (2) Coronary flow changes, recorded by a signal magnet connected with the perfusing apparatus in such a way that each interval marked on the line corresponds to an inflow of 3 c.c. into the coronary vessels. The numbers above this line show the calculated rates of coronary inflow per minute (C.F.). (3) Heart contractions—systole above and diastole below—as recorded by a lever attached to the apex of the left ventricle. The number of heart beats during a given time can be counted, and above the record are shown the calculated heart rates per minute (H.R.).

A volume of 1 c.c. of Locke's solution was used to dissolve the quantity of drug injected in each case (except otherwise stated) and the injections were made through a short rubber connection in the apparatus near the heart, and while the record was being taken.

The biphosphate of triethanolamine trinitrate ($N[CH_2CH_2O.NO_2]_3 \cdot 2H_3PO_4$) was used, and is referred to throughout simply as triethanolamine trinitrate. Since a 10% alcoholic solution of nitroglycerin was used in our earlier work⁵ a similar solution of triethanolamine trinitrate was employed in this study. This was kindly supplied by Metadier (Canada) Limited, Montreal.

RESULTS

Fig. 1 shows that after injection of 0.008 mgm. (A), there is a rapid brief increase (about 50%) in the rate of coronary flow, but within 60 seconds the preinjection rate was restored. This was the smallest effective dose of the drug, and as can be seen from the record there was no associated change in rate or amplitude of the heart contractions.

The figure also shows effects of a dose of 0.04 mgm. (B). There was again an immediate increase (about 60%) in coronary flow rate, but this was more sustained than with the smaller dose, and the control rate was only re-established about 3 minutes after the injection

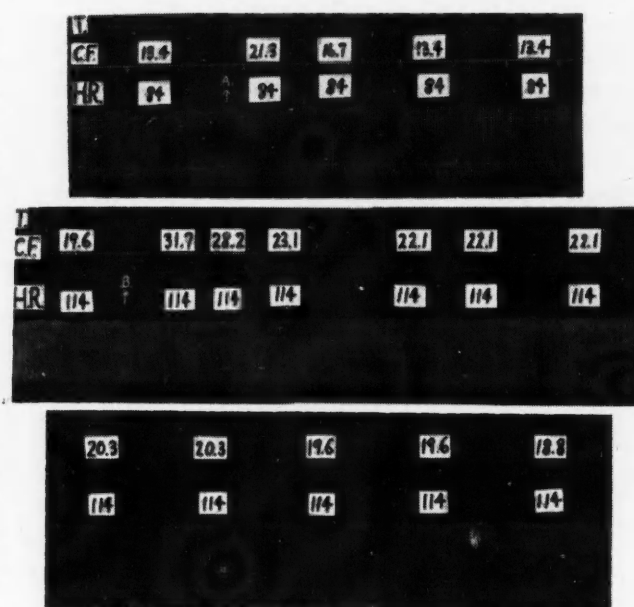


Fig. 1.—Isolated rabbit heart perfusion. Records of 2 experiments (see text). At A, 0.008 mgm., and at B, 0.04 mgm., of triethanolamine trinitrate, were injected. The middle and lower tracings are continuous.

(lower record). Again, it can be seen that there was no associated change in heart action.

Fig. 2 shows effects of a dose of 0.2 mgm. of drug injected at A. Following the injection the rate of coronary flow was more than doubled (from 15.1 c.c. before to 39.0 and 33.5 c.c. per min. after). There was also a slight transient depression of the amplitude of the heart contractions. The coronary flow then decreased progressively but was still higher (19.5 c.c. per min.) than the control rate (15.1 c.c. per min.) almost 5 minutes after the injection. These changes were associated with a slight transitory increase in heart rate.

In Fig. 3 are seen effects of still higher doses of the drug. Thus, after 1.0 mgm. (B), there was a more than threefold immediate increase in coronary flow. This effect was, however, associated with myocardial depression but again there was a slight tachycardia. Finally at C, an injection of 5 mgm. of the drug (given in 5 c.c. of Locke's solution) temporarily stopped the heart contractions—the coronary flow increase was somewhat less marked.

In Table I is presented an analysis of the comparative effects of triethanolamine trinitrate and nitroglycerin. The data on nitroglycerin were those previously published in connection with our earlier studies on this agent.⁵

By dividing the calculated coronary flow per minute by the calculated heart rate per minute, the coronary flow per heart beat can be obtained.

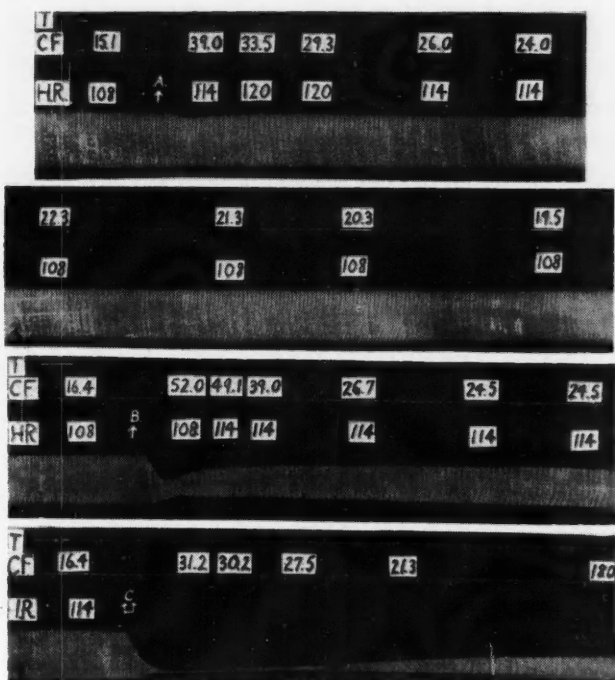


Fig. 2. (Upper records).—Isolated rabbit heart perfusion. Record of one experiment (see text). At A, 0.2 mgm. of triethanolamine trinitrate was injected. The two tracings are continuous.

Fig. 3. (Lower records).—Isolated rabbit heart perfusion. Records of 2 experiments (see text). At B, 1 mgm., and at C, 5 mgm. of triethanolamine trinitrate (in 5 c.c. Locke's) were injected.

The figures in the last column of the table show the relative changes in respect to coronary flow per heart beat following the two drugs. It can be readily seen that with a dose of 0.008 mgm. of each (Exps. 1 and 2) triethanolamine trinitrate produces a somewhat better effect. Exps. 3 and 4 show that, with a dose of 0.04 mgm., the initial response to the two agents was almost identical, but the duration of the triethanolamine trinitrate response was much longer. Exps.

5 and 6 again show that with a dose of 0.2 mgm., the triethanolamine trinitrate effect was both more striking and more prolonged.

Similar results to those described above were generally obtained in several different experiments, but an exact quantitative comparison of the two is rather difficult to make, because of a slight tolerance to repeated injections of either agent when made in the same isolated heart preparation. The duration of action of the drug was however almost invariably longer than that of nitroglycerin, in equal doses. It may be concluded therefore that triethanolamine trinitrate exerts a more prolonged and as good, if not slightly better, coronary vasodilator action than nitroglycerin, under these conditions.

The two drugs also showed approximately equal toxic actions on the isolated rabbit heart, and as previously shown⁵ a dose of 5 mgm. of nitroglycerin also induces complete cardiac arrest.

In connection with these studies it was also of interest to compare the effects of the two agents, when repeated injections were given, in order to test their possibility of inducing some tolerance as mentioned above. Figs. 4 and 5, show results of two such experiments, in each of which 4 successive doses of 0.2 mgm. of either triethanolamine trinitrate (Fig. 4) or nitroglycerin (Fig. 5) were injected at 10 minute intervals.

These figures need little comment. They show clearly that there is little difference in the immediate effects of repeated injections of equal doses of the two agents. It appears that in the nitroglycerin experiment (Fig. 5) there is a somewhat greater cumulative depression of

TABLE I.

Exp. No.	Agent used	Dose injected mgm.	Coronary flow per min. c.c.	Heart rate per min.	Coronary flow per heart beat c.c.	Time seconds	Coronary flow per min. c.c.	Heart rate per min.	Coronary flow per heart beat c.c.	Increase (+) or Decrease (—) in coronary flow per beat percentage
1	Nitroglycerin	0.008	12.9	125	0.103	5-10	13.9	120	0.116	+11.0
2	Triethanolamine trinitrate	0.008	13.4	84	0.16	5-10	11.1	125	0.089	-13.8
3	Nitroglycerin	0.04	12.3	115	0.107	5-10	21.3	84	0.25	+56.2
4	Triethanolamine trinitrate	0.04	19.6	114	0.17	60	13.4	84	0.16	0
5	Nitroglycerin	0.2	13.7	120	0.114	5-10	20.0	110	0.182	+70.2
6	Triethanolamine trinitrate	0.2	15.7	108	0.14	60	14.1	125	0.113	+ 5.6
						120	31.7	114	0.28	+64.7
						60	23.1	114	0.20	+17.7
						120	22.1	114	0.19	+11.8
						5-10	19.2	95	0.202	+77.3
						60	11.2	125	0.090	-21.1
						5-10	39.0	114	0.34	+142.9
						60	29.3	114	0.26	+85.7
						120	24.0	114	0.21	+50.0
						180	21.3	108	0.19	+35.8
						280	19.5	108	0.18	+28.6

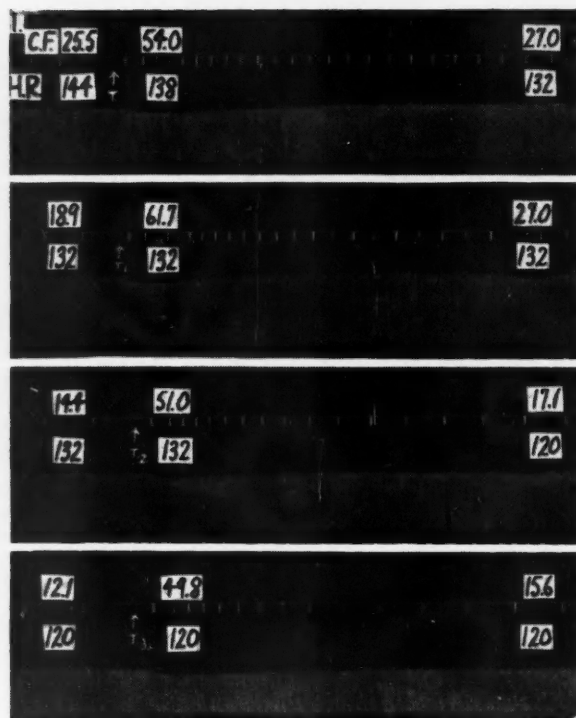


Fig. 4.—Isolated rabbit heart perfusion. Records of one experiment (see text). At T, T₁, T₂, and T₃, 0.2 mgm. of triethanolamine trinitrate were injected at successive 10 minute intervals.

both the rate and amplitude of the contractions, than was observed in the triethanolamine trinitrate experiment (Fig. 4). These effects might conceivably influence the coronary flow, but, all in all, it may be concluded, that in respect to their coronary vasodilator actions the two agents show similar slight degrees of tolerance to repeated injections in this preparation.

2. Effects on blood pressure in anesthetized animals.

Fig. 6 shows results obtained in 3 experiments on different species of animals and in which triethanolamine trinitrate and nitroglycerin were compared for their effects on blood pressure following intravenous injections. The blood pressure was recorded from a common carotid artery and the injections made into an exposed femoral vein.

At A and B, in each experiment, equal small doses of the drugs were injected. As can be seen, in each case a definite depressor response to nitroglycerin was obtained, but there was little or no effect produced by triethanolamine trinitrate. At C and D, in Exp. 1 and again, at D and E, in Exp. 2, however, approximately equal depressor responses were obtained, when the doses of triethanolamine trinitrate used were 10 and 20 times, respectively, the doses of

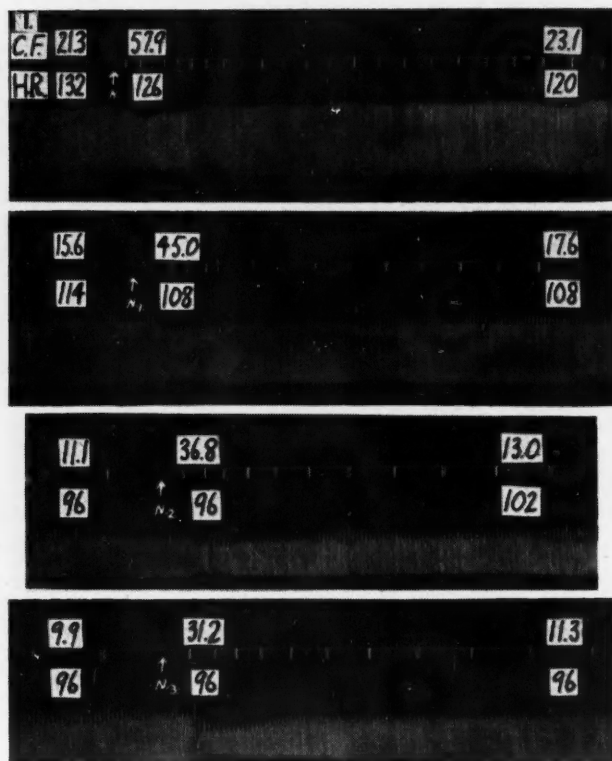


Fig. 5.—Isolated rabbit heart perfusion. Records of one experiment (see text). At N, N₁, N₂, and N₃, 0.2 mgm. of nitroglycerin, were injected at successive 10 minute intervals.

nitroglycerin used. In the anesthetized dog (Exp. 3), as shown at D and E when 10 times as large a dose of triethanolamine trinitrate as of nitroglycerin was injected, the depressor response produced was considerably less.

It may be concluded therefore that triethanolamine trinitrate exerts much less depressor effect than nitroglycerin under these conditions.

3. Effects on the electrocardiogram of anesthetized animals.

It has long been known that nitroglycerin exerts little significant effect on the electrocardiogram in small and moderate doses. In the course of the blood pressure experiments referred to above, electrocardiograms (Lead II) were taken at frequent intervals. All in all, the results obtained were essentially negative. An example of one such experiment is reproduced in Fig. 7.

As can be seen, even with a dose of 9.0 mgm. per kg. of triethanolamine trinitrate (D), which produces a somewhat prolonged depressor effect there was no significant change in the form of the electrocardiogram. There was, however, a slight associated brief increase in heart rate (probably reflex) from 160 per minute before

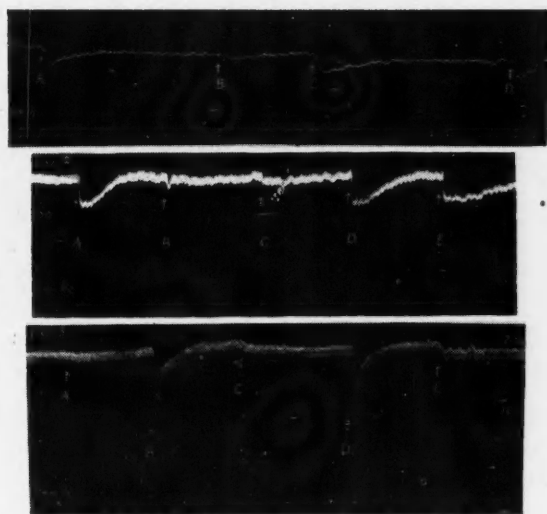


Fig. 6.—Blood pressure records. Chloralose anaesthesia. *Exp. 1.* Rabbit, 3.15 kg. At A and D, 0.12 mgm. per kg. nitroglycerin were injected. At B and C, 0.12 mgm. and 1.2 mgm. per kg., respectively, of triethanolamine trinitrate were injected. *Exp. 2.* Cat, 3.05 kg. At A and D, 0.12 mgm. per kg. of nitroglycerin were injected. At B, C and E, 0.12, 0.3, and 3 mgm. per kg., respectively, of triethanolamine trinitrate were injected. *Exp. 3.* Dog, 10.0 kg. At A, C and E, 0.05 mgm., 0.1 mgm. and 0.5 mgm. per kg., respectively, of triethanolamine trinitrate were injected. At B and D, 0.05 mgm. per kg. of nitroglycerin, were injected.

the injection (No. 10) to 180 per minute (No. 11) and 175 per minute (No. 12), returning to the control rate shortly (No. 13).

In a number of other experiments in which still larger doses of drugs were used, triethanolamine trinitrate like nitroglycerin, produced a slight T wave elevation and more marked cardiac acceleration. All in all, there was little significant difference in the effects of the two agents on the electrocardiogram in the anaesthetized dogs.

4. Effects on cardiac output and heart rate in the heart-lung preparation.

The effects of the two agents on heart output and heart rate, were also compared, using the dog heart-lung preparation. Cardiac output was measured directly for periods of 10 to 15 seconds, at frequent intervals, and the heart rate changes recorded electrocardiographically. In six experiments in which doses of each drug, ranging from 5 to 50 mgm. were injected, the two agents showed rather similar results. Doses of 5 to 10 mgm. produced only a brief increase in heart output and transient cardiac acceleration. With larger doses (25 to 50 mgm.) there was only a progressive decrease in output and rate, with both agents. Table II, shows an example of results obtained in one experiment in which a dose of 25 mgm. of each agent was in-

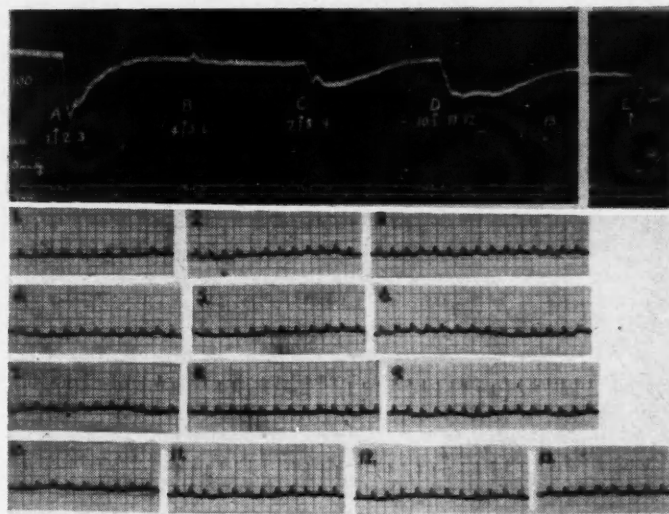


Fig. 7.—Blood pressure record and electrocardiograms (Lead 11). Dog, 7.0 kg. Pentobarbital sodium anaesthesia. Artificial respiration. At A and E, 0.14 mgm. per kg. nitroglycerin were injected. At B, C and D, 0.14 mgm., 1.4 mgm. and 9 mgm. per kg., respectively, of triethanolamine trinitrate were injected. Electrocardiograms—Nos. 1 to 13—were taken at the corresponding points shown on the blood pressure tracing.

jected. In this experiment, as can be seen, following the triethanolamine trinitrate the cardiac output decreased within 15 minutes from a control of 540 c.c. per minute to 384 c.c. per minute and the heart rate was concomitantly decreased from 155 to 130 per min. Later

TABLE II.
HEART-LUNG PREPARATION
Dog. 13.0 kg. Chloralose anaesthesia. 600 c.c. reservoir.

Time	Cardiac output per min. c.c.	Heart rate per min. c.c.
3:11	540	155
3:12	540	155
3:12 : 30	Injected 25 mgm. triethanolamine trinitrate	
3:13	522	155
3:14	504	150
3:15	486	150
3:17	498	140
3:19	428	120
3:21	528	135
3:25	462	130
3:27	408	130
3:29	384	130
3:29 : 30	Injected 0.1 mgm. adrenaline	
3:30	690	230
3:31	540	180
3:34	498	155
3:36	480	155
3:36 : 30	Injected 25 mgm. nitroglycerin	
3:37	480	160
3:38	432	155
3:40	378	145
3:42	348	135
3:44	330	130
3:44 : 50	Injected 0.1 mgm. adrenaline	
3:45	600	230
3:46	450	200
3:47	450	195
3:49	420	175

on, a similar injection of nitroglycerin produced within 8 minutes a decrease in output from 480 c.c. per minute to 330 c.c. per minute, and in rate from 155 to 130 per minute. Following each of these injections both cardiac output and heart rate were promptly restored by an injection of 0.1 mgm. of adrenaline.

In view of the slight changes in cardiac output observed with small doses of either agent and the rather high doses necessary to depress the heart output and rate, it is concluded that triethanolamine trinitrate like nitroglycerin is rather non-toxic to the heart-lung. The similarity of the effects produced by the two agents in this preparation lends some confirmation however to the rather similar effects of the two agents in the isolated rabbit heart preparation, as already described.

5. Acute toxicity studies in rats and rabbits.

The experiments described above already suggest that triethanolamine trinitrate is not a very toxic agent. It was of interest however, to test its acute toxicity in rats and rabbits. Following intravenous injections of doses of 25 mgm., 50 mgm., and 75 mgm. per kg. in each of 3 groups of 10 rats, mortalities of 10, 50 and 100% respectively, were obtained. The animals were observed for 7 days after the injection of the smaller doses, but death occurred within 4 days with the largest dose.

As is well known nitroglycerin is rather non-toxic to experimental animals,⁷ and indeed in a similar series of tests, doses of 25 and 50 mgm. per kg. produced zero mortality, while doses of 75 and 100 mgm. per kg. produced, respectively, 20 and 30% mortalities.

It may be concluded then that nitroglycerin is somewhat less toxic under these conditions.

It has been reported by Oltman and Crandall⁸ that the fatal dose of nitroglycerin for rabbits following intravenous injection, is 45 mgm. per kg. In a small number of rabbits injected intravenously with triethanolamine trinitrate, it was found that a dose of 50 mgm. per kg. produced intense clonic convulsions in 2 to 3 minutes, with recovery in 10 minutes. The animal was still alive and well 30 days later. A dose of 100 mgm. per kg. in another animal also produced marked convulsions, and death in 6 days. Larger doses (200 mgm. per kg.) were rapidly fatal, while a smaller dose (25 mgm. per kg.) was without effect, apart from producing a brief convulsion.

The above scant toxicity data suggest that tri-

ethanolamine trinitrate, like nitroglycerin, is rather non-toxic to laboratory animals considering the high doses injected in the above tests. It would be desirable to test the chronic toxicity of the drug and its possible influence in producing methæmoglobin. However, it may be stated that no gross evidence of darkening of the blood was observed after injection of the drug in any of our earlier described experiments on blood pressure, etc.

6. Possible mechanism of action.

While it is generally believed that the vasodilator action of the organic nitrates is due to their hydrolysis and release of nitrite (NO_2) ions, the later experiments of Krantz, Carr, Forman, and Ellis,⁹ Krantz, Carr, Forman and Cone,¹⁰ and Yagoda and von Oettingen,¹¹ would rather suggest that the pharmacological effects of such nitrates do not depend exclusively on the liberation of nitrite groups. The very rapid effects produced by nitroglycerin and triethanolamine trinitrate in the above experiments, would rather confirm this idea.

It was of some interest therefore to compare the ease of alkaline hydrolysis of triethanolamine trinitrate and nitroglycerin, *in vitro*. Without going into the details of these tests, it can be stated that triethanolamine trinitrate is much less readily hydrolyzed *in vitro* than nitroglycerin, and this would rather support the view that the drug might exert its actions without conversion to nitrite. This point however, requires further study.

The experiments described in the first section of the paper also show clearly that triethanolamine trinitrate like nitroglycerin⁴ produces direct coronary vasodilatation, and that the increased coronary flow is not due to depression of the myocardium which occurs only with large doses of the two drugs.

Why the drug is apparently as effective as nitroglycerin on the coronary vessels but so much less effective as a depressor agent is not clear. It has long been known that amyl nitrite can produce coronary dilatation in doses which do not affect blood pressure and the observation reported by Bovet and Nitti-Bovet (*v.s.*) that dilatation of the vessels of the nasal mucosa can occur with small doses of triethanolamine trinitrate which do not affect blood pressure level, would rather indicate that differences in responsiveness of different parts of the vascular system also exist in the intact

animal. As stated earlier the soluble biphosphate of triethanolamine trinitrate was used in these studies, and it is possible that the higher water solubility of the drug than nitroglycerin might be a factor in explaining its generally higher activity in the coronary experiments.

In view of the fact that triethanolamine trinitrate is a tri-substituted nitrogen compound, it has some similarity to choline and acetylcholine, and it was thought perhaps that it had some cholinergic action. This however could not be substantiated, as the depressor action of the drug is not prevented by atropinization, and in addition, the drug also depresses the isolated rabbit intestine. Its action is therefore basically that of a smooth muscle depressant like other organic nitrates.

CONCLUSIONS

1. The experiments presented above show that triethanolamine trinitrate is an effective coronary vasodilator agent in the isolated perfused rabbit heart, and that it compares favourably with nitroglycerin. Its duration of action also appears to be more prolonged. The two show little difference in respect to the development of a slight tolerance to this action on

repeated injections.

2. It is also shown that nitroglycerin exerts a more marked acute vasodepressor action than triethanolamine, dose for dose, in anaesthetized animals of different species.

3. Both agents exert little significant effect on the electrocardiogram or cardiac output (in heart-lung preparation), in small doses. Larger doses of both however depress cardiac output and slow heart rate.

4. Acute toxicity studies on rats and rabbits show that both agents are relatively non-toxic when injected intravenously.

5. The possible mechanism of action of triethanolamine trinitrate is discussed.

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TRIETHANOLAMINE TRINITRATE (METAMINE) IN THE TREATMENT OF ANGINA PECTORIS. A PRELIMINARY REPORT*

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STUDIES on the pharmacology of triethanolamine trinitrate have been described by Melville and Lu in the preceding paper. Their findings in experimental animals prompted us to make clinical trials in man and the present communication is a preliminary report thereon.

Although this preparation has been marketed in Europe, the literature concerning it is scant, and we know of only two papers dealing with observations on the human. Poumailloux and Tetreau¹ in 1949 described case histories of 18

patients suffering from angina pectoris who were treated with varying dosage of the drug, with apparent improvement in most of them. In six the results were described as good, and in three as very good. Side effects were absent except for heartburn in one, and sufficient nausea in another to warrant stopping treatment. The second paper, by Pfeiffer,² deals with circulatory dynamics in healthy individuals, and seems to have little clinical significance.

MATERIAL

The five patients selected for clinical trial were considered to have arteriosclerotic coronary disease, and have been followed during the past four years in the Cardiology and Medical Clinics of the Queen Mary Veterans' Hospital. All had averaged five or more attacks of pain daily, and were relieved quickly by rest, or within a minute after taking nitroglycerine. In all of them an exercise tolerance test had at some time shown electrocardiographic changes characteristic of coronary insufficiency. Three

* Presented before the Montreal Cardiac Society, May 9, 1951.

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had had myocardial infarctions during the past three years, but none within six months. All continued working at sedentary occupations throughout the trial, except one who was retired on pension.

METHOD

At the beginning it was explained to each patient that we wished to test three new drugs, any or none of which might be effective. If and when pain occurred he was to take nitroglycerine as usual, but all other medication was discontinued. He was provided with a diary form to fill out daily, indicating the number of attacks, their duration, severity, and the amount of effort precipitating them. When attacks came on during rest their relation to meals, emotional stimuli, weather, fatigue, or other factors was to be noted. Finally he was to give his impression of each day, whether excellent (no pain), good, average or poor.

The preparation used for the clinical trials was the biphosphate of triethanolamine trinitrate, and was kindly supplied by Metadier (Canada) Limited, of Montreal, under the trade name Metamine, by which it will be hereinafter described.

The investigation was carried on from September 1950 to January 1951, and was divided into four stages: first there was a control period of three or four weeks, then came in succession three periods each of three weeks, on placebo A (enteric coated chalk), metamine, and placebo B (lactose). The tablets were taken four times daily: three times before meals, and at bed time. Each dose of metamine was 2 mgm.

The patients returned at the end of each period to hand in their diaries and receive the medication for the next period. So as to reduce suggestion to a minimum, no attempt was made at these visits to interview or examine them. All results have been compiled from the diaries and are, therefore, the subjective responses of the patients themselves.

CASE 1

Male, aged 53, occupation, storekeeper. Stable, conscientious personality. Coronary occlusion diagnosed in 1948. Known angina of effort for six years. Pain in mid-sternal area radiating to both arms, is induced by walking 50 to 100 yards, and is quickly relieved by rest and by nitroglycerine. Known diabetic since 1948, now under control. Physical examination essentially normal, apart from tortuous radial and retinal vessels. Blood pressure 120/80.

Control period: 5 to 12 attacks daily, with an average of 7 for the three weeks.

Placebo A: 5 to 11 attacks daily; average 8. Had a mild upper respiratory infection during the first week. Patient's subjective impression: average to bad.

Metamine: Daily average number of attacks was 0.75. During the first day there were 8 attacks, and during the second day 3. During the remaining 19 days of this period he was entirely free from pain on 11 days, and had 1 to 3 attacks per day on the other 8 days. Patient's impression: excellent to good.

Placebo B: Average 5.5 attacks daily. For the first 6 days he had from 1 to 3 attacks daily (average 2.2), and for the remaining 15 days had from 4 to 9 (average 7.4). Patient's impression: average to bad.

CASE 2

Male, aged 45, occupation factory labourer. Known angina of effort since 1941. Pain in midsternal and epigastric area is induced by walking one to two city blocks, and is quickly relieved by rest and by nitroglycerine. Chronic bronchitis and asthma since 1940. Physical examination revealed sibilant râles at lung bases. Blood pressure 140/90.

Control period: 7 to 12 attacks daily, with an average of 9 for the three weeks.

Placebo A: 5 to 12 attacks daily; average 7.

Metamine: Daily average number of attacks was 4. During the first and second days he had 6 pains daily. He had a consistent level of 4 attacks daily for the remainder of the three week period except for the sixth day when he was free from any pain.

Placebo B: 3 to 6 attacks daily (average 4.4).

CASE 3

Male, aged 50, occupation office-worker. Known angina of effort for eight years. Pain in midsternal area radiating to both arms, is induced by walking one to two city blocks, and is quickly relieved by rest and by nitroglycerine. Recurrent attacks of mild bronchitis since 1940. Physical examination essentially normal apart from occasional râles at lung bases and arteriosclerotic radial and retinal vessels. Blood pressure 140/75.

Control period: 3 to 6 attacks daily with an average of 4.5 for the three weeks.

Placebo A: 2 to 8 attacks daily; average 4.2.

Metamine: Daily average number of attacks was 2.6; on the majority of days 2 or 3 attacks occurred. He was entirely free from pain on two days.

Placebo B: 3 to 8 attacks daily during two week period; average 4.5.

Admitted to hospital at the end of two weeks with severe substernal pain and evidence of coronary occlusion.

CASE 4

Male, aged 40, occupation, office-worker. Coronary occlusion diagnosed in July 1946 and in March 1950. Known angina of effort for five years. Pain in midsternal and precordial area radiating to both arms, is induced by walking six to eight city blocks, and is quickly relieved by rest and by nitroglycerine. Physical examination essentially normal apart from tortuosity of radial and retinal vessels. Blood pressure 140/80.

Control period: 4 to 9 attacks daily with an average of 6.5 for the three weeks. Subjective impression: average during 18 days, good during three days. Started on metamine at end of control period.

Metamine: 0 to 5 attacks daily with an average of 3.5 for the three weeks. Subjective impression: excellent during three days, good during 17 days, average during one day.

Placebo B: four days after placebo was started attacks recurred with the same frequency as during control period and he refused to continue with the trial.

CASE 5

Male, aged 57, pensioner. Coronary occlusion diagnosed in 1947. Known angina of effort for seven years. Pain in midsternal area is induced on such slight effort as walking about his home, and is quickly relieved by rest and by nitroglycerine. Physical examination revealed marked generalized arteriosclerosis. Blood pressure 150/90.

Control period: 2 to 10 attacks daily, with an average of 7.2 for the three weeks.

Placebo A: 3 to 12 attacks daily; average 8.

Metamine: Number of attacks on the first eight successive days was respectively 6, 8, 4, 5, 2, 3, 0, 0.

Developed an upper respiratory infection on the ninth day with recurrence of attacks up to 10 or 12 per day despite bed rest. Admitted to hospital on the twelfth day with severe precordial pain and electrocardiographic changes indicative of recent myocardial damage.

DISCUSSION

We are of course well aware of the impossibility of drawing thoroughly satisfactory conclusions from a small number of cases, especially where the results are dependent on the patients' own subjective interpretations. Nevertheless, we feel that in this small group the element of suggestion has been pretty adequately eliminated, and that the patients were all unaware of which drug, if any, was expected to yield results.

Subjective improvement was noted by all five patients, and each of them while on metamine had days during which although active he was completely free from pain; none of them had had such an experience for more than a year. In every case the daily average number of attacks while under treatment was smaller, the most pronounced result being in Case 1, where the average dropped from eight to less than one.

In three cases a lag of at least two days was noted after the drug had been started, before the number of attacks dropped significantly. This would appear to indicate the build-up of a certain concentration in the individual before the drug becomes effective, and a slow elimination. This impression is enhanced by the observation in two cases that the seeming beneficial effect of the metamine was actually carried forward for a few days into the period during which the patient was taking the second placebo. This observation of a period of lag and carry-over demonstrates at the same time the elimination of suggestion as a factor in the interpretation of results.

No side-effects, such as headaches, nausea, or gastric irritation, were obvious.

It was not felt that the coronary occlusion which occurred in Case 3 after he had been off metamine for two weeks could be reasonably related to it. Whether the same can be said about the attack which developed in Case 5 while the patient was still taking the drug is at least open to question; it is known that similar attacks had been experienced by the patient on several previous occasions. The observations, nevertheless, should be regarded as a reminder that until more is known about the drug, con-

siderable care must be exercised. Poumailloux and Tetreau¹ reported electrocardiographic changes as occurring in two of their patients during treatment. They also felt that acute coronary occlusion was a contra-indication to the use of metamine.

During this investigation no attempt was made to observe such changes as might presumably occur in the blood pressure and the electrocardiogram. Neither was there any question of trying to adjust the dosage to the severity of the case or to any other factor. It may well be that such a procedure would have resulted in even better results than were obtained with the arbitrary dosage that was actually employed. Further studies are necessary in order to settle these points. It is also important to observe the effect of long-continued administration of the drug, particularly as regards the possible development of tolerance.

SUMMARY

Triethanolamine trinitrate (metamine) was administered to five patients with angina pectoris over three-week periods. These alternated with control periods on placebos. While on the drug all patients showed a reduction in the daily number of attacks.

The results obtained are sufficiently promising to warrant further clinical studies.

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RÉSUMÉ

Les auteurs rapportent les observations qu'ils firent chez cinq patients souffrant d'angine de poitrine et soumis pendant des périodes de trois semaines au trinitrate de thiethanolamine (métamine). Bien qu'il fallut se fier aux interprétations subjectives de leurs propres réactions chez ces quelques malades seulement, il apparut néanmoins que ce nouveau médicament a notablement diminué le nombre des attaques quotidiennes. On ne remarqua également aucun effet secondaire, céphalée, nausée ou irritation gastrique.

Alors qu'il ne s'était pas passé un jour depuis plus d'un an sans qu'ils n'aient souffert, tous ces cinq malades, pendant qu'ils furent sous traitement, connurent des jours où ils restèrent complètement asymptomatiques; dans le premier cas notamment, les attaques tombèrent en moyenne de huit qu'elles étaient à moins d'une. Les comprimés de métamine, dosés à 2 milligrammes, furent donnée systématiquement à raison de quatre par jour. Aucun effort ne fut tenté pour ajuster la posologie en proportion avec la gravité de chaque cas individuel, ce qui fait croire aux auteurs que les résultats eussent peut-être été encore meilleurs si l'on n'avait pas usé d'un tel dosage arbitraire. Ils considèrent aussi comme important d'observer les effets d'une administration longtemps prolongée de la drogue, particulièrement en ce qui concerne sa tolérance. Somme toute, ils estiment que les résultats obtenus sont suffisamment prometteurs pour en faire un essai clinique plus poussé.

NPH INSULIN*

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LATE in 1950 there was made generally available in Canada and the United States a new preparation of insulin under the name "NPH Insulin". The object of the present paper is to record some details of a chemical nature and the results of laboratory experiments concerning this preparation. Clinical studies of it are left for report by others.

NPH insulin is an outcome of continued studies with preparations of insulin, protamine and zinc in various proportions, and of clinical investigations with a number of these preparations. The use of substances such as protamine to prolong the action of insulin was first suggested by Hagedorn and associates.¹ Clinical results were reported by this Danish group in

There are in general use in Canada four insulin preparations differing in composition and in blood-sugar-lowering effect. These are insulin, protamine zinc insulin, globin insulin with zinc, and NPH insulin. The approximate composition and some of the chemical characteristics of each of these are shown in Table I. The blood-sugar-lowering effect of each preparation is indicated in Fig. 1. This chart is a record of the average blood-sugar levels in groups of 32 normal rabbits following the injection of equal amounts of each preparation.

From Fig. 1 it will be noticed that the effect of protamine zinc insulin is characterized by a relatively retarded lowering of the blood-sugar level and maintenance of a low level for an extended period. In a very large number of instances this prolonged effect is of great benefit and reduces or eliminates the need for multiple daily injections. For some patients, however, clinicians have expressed a desire for

TABLE I.
APPROXIMATE COMPOSITION AND PROPERTIES OF VARIOUS INSULIN PREPARATIONS

	<i>Insulin</i>	<i>Globin insulin with zinc</i>	<i>Protamine zinc insulin</i>	<i>NPH insulin</i>
Physical form	solution	solution	suspension—amorphous	suspension—crystalline
Acidity	pH 3.0	pH 3.6	pH 7.2	pH 7.2
Zinc content per 100 units	0.03 mgm.	0.3 mgm.	0.2 mgm.	0.03 mgm.
Modifying agent per 100 units	none	3.8 mgm. globin	1.3 mgm. protamine	0.4 mgm. protamine
Isotonic agent	glycerin	glycerin	glycerin	glycerin + sodium chloride
Buffer	none	none	sodium phosphate	sodium phosphate
Preservative	phenol or cresol	phenol	phenol or cresol	m-cresol
Package	cylindrical vial	cylindrical vial	cylindrical vial	square vial

1936. From these it was evident that the addition of protamine to insulin resulted in preparations having prolonged blood-sugar-lowering effects. Subsequently it was shown at the Connaught Medical Research Laboratories² that the physical properties of protamine-insulin preparations could be substantially improved by the addition of a small amount of zinc, a metal which Scott³ had already found to be an essential constituent of crystalline insulin preparations, and which was known to be present in relatively large amounts in the pancreas. From these studies protamine zinc insulin resulted and today accounts for more than 65% of the total of insulin preparations used in Canada.

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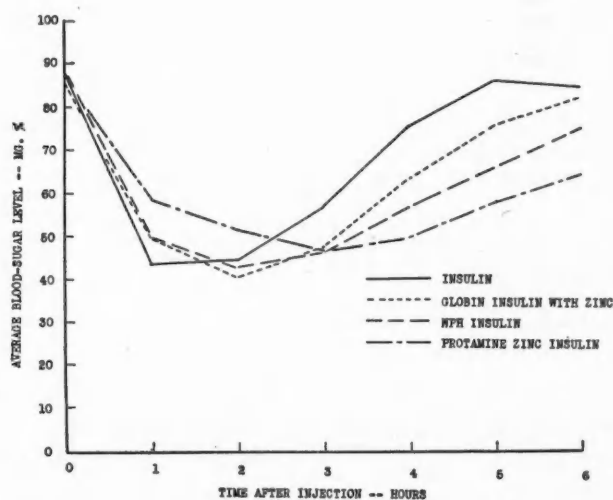


Fig. 1.—The average blood-sugar levels in groups of 32 normal rabbits following the subcutaneous administration of equal amounts of insulin, globin insulin with zinc, NPH insulin, and protamine zinc insulin.

a protamine-insulin preparation acting more quickly than protamine zinc insulin and for only 22 to 26 hours rather than 36 hours as is sometimes the case with protamine zinc insulin. Several years ago, in an endeavour to obtain a preparation having these desired characteristics, various mixtures of insulin and protamine zinc insulin were prepared and tested on normal rabbits. The experiments were discontinued, however, when it was found that successive samples were not sufficiently uniform to warrant considering the mixed preparations as generally suitable for clinical use.

There are many clinical reports dealing with the use (in many instances successful use) of mixtures of protamine zinc insulin and insulin prepared in a syringe but these mixtures too are subject to the objection that different batches of insulin and protamine zinc insulin may yield mixtures having varying effects and involving, therefore, an element of dissatisfaction for both physician and patient. An explanation for this variation from batch to batch is evident when one appreciates that protamine zinc insulin contains an excess of protamine. Provision for this excess of protamine was made in 1937 by the Insulin Committee in consultation with all insulin laboratories in North America, it being then desired to establish specifications for protamine zinc insulin which would help ensure uniformity in blood-sugar-lowering effect of the preparation from batch to batch. The fact that the quantity of foreign protein in protamine and in insulin could vary formed the basis for this specification, and experience of the intervening years has justified the decision which was made.

Further efforts to produce protamine-insulin preparations having specially desired clinical characteristics noted above were concerned with the varying of protamine content, and with the use of neutral or acidic compositions. Many compositions were prepared for laboratory and clinical trial. In an endeavour to provide a means for the ready identification of the various types of insulin preparations considered during the investigation, a code system of designation was adopted. For example, a neutral preparation of insulin, protamine and zinc in which the protamine was present to the extent of 0.50 mgm. per 100 units of insulin was designated "Type NP50". It arose out of this code system that the designation NPH insulin was adopted for

the preparation recently made available for general use. However, the individual letters N, P, and H no longer carry any significance in the name NPH insulin now officially used for preparations of Canadian or United States origin.

It was felt that the simple designation NPH insulin was short and convenient and clearly indicated the presence of the antidiabetic hormone. At the same time, the new designation was sufficiently different from names already in use for other modified or unmodified preparations that confusion in the minds of patients or others was unlikely to result. In addition, arrangements were made whereby NPH insulin would be distributed only in vials having a square cross-section, and it was agreed that other insulin preparations should continue to be distributed only in vials having a round cross-section. It was hoped that this policy would also assist in avoiding confusion between protamine zinc insulin and NPH insulin, each of which forms a white suspension upon shaking.

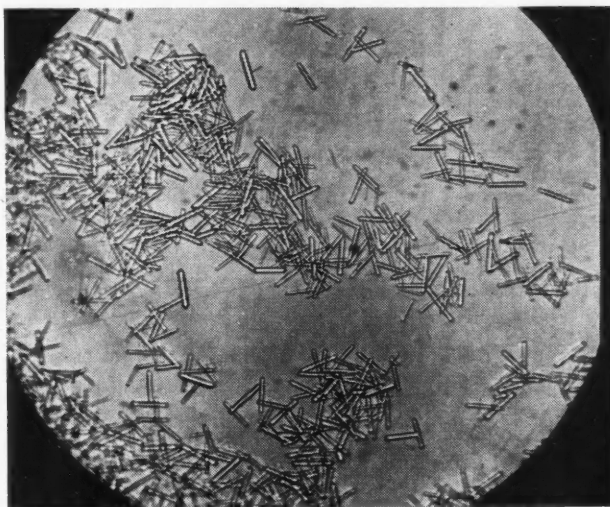


Fig. 2.—Photomicrograph of precipitate in NPH insulin showing crystals containing the anti-diabetic hormone, zinc, and protamine. $\times 244$.

NPH insulin, 40 or 80 units per c.c., is a buffered, aqueous suspension of crystals containing insulin, protamine and zinc. A photomicrograph of the crystals is shown in Fig. 2. Methods and conditions for the production of crystals containing insulin, protamine and zinc of good quality and in high yields were first described by Krayenbuhl and Rosenberg.⁴ One of the essential steps in the preparation is the use of purified protamine in a quantity such that it is sufficient, but only sufficient, to precipitate all the anti-diabetic activity of the preparation.

Ideally, the supernatant solution from NPH insulin should contain no excess of either insulin or protamine. In other words, the addition of a small quantity of either protamine or insulin to the clear supernatant fluid from NPH insulin should cause no cloudiness. In practice, however, it has been found desirable to permit the presence of a small excess of protamine. In these circumstances the addition of insulin to the clear supernatant fluid may result in slight cloudiness. In describing the quantity of a batch of protamine thus required for use with a lot of insulin to produce satisfactory NPH insulin the term "isophane ratio" has been coined. The isophane ratio is the minimum quantity expressed in milligrams (never in excess of 0.6 mgm.) of protamine required for use with 100 units of insulin.

In the preparation of NPH insulin it is essential to use zinc-insulin crystals which are relatively free from foreign protein insoluble at pH7. The rate of formation of the crystals of insulin, protamine and zinc has been shown to be dependent upon the presence of phenolic compounds. It has also been found that in many instances the presence of a small amount of sodium chloride is desirable for ensuring the preparation of a uniformly crystalline product. Thus in Canadian supplies of NPH insulin both sodium chloride and glycerin are present. The preservative is meta-cresol. The crystalline precipitate is formed at the time of filling into vials. This filling comprises two operations. An acidic solution of zinc-insulin crystals and protamine is first placed in the vials. This is followed immediately by an alkaline buffer solution such that the acidity becomes about pH 7.2, resulting in the formation of a precipitate which is or will shortly thereafter be crystalline in form. Each solution contains appropriate quantities of glycerin, sodium chloride and meta-cresol.

NPH insulin is yet another preparation of crystalline nature containing the antidiabetic hormone of the pancreas. Scott's fundamental work showed the necessity for the presence of zinc (or certain other metals) for the preparation of insulin crystals, and all methods used today for the preparation of insulin in crystalline form for therapeutic use are a result of that work. Likewise, the modification of protamine-insulin to form protamine zinc insulin is an outcome of studies on the preparation of insulin crystals. The presence of zinc in the protamine-insulin crystals of NPH insulin is

further evidence of the peculiar relation between the anti-diabetic hormone and certain metals.

It has always been the endeavour of the Insulin Committee and of the manufacturers in Canada and the United States to ensure uniformity in effect of insulin preparations from batch to batch, irrespective of whether the batch be from one or another manufacturing laboratory. This task is made easier with NPH insulin, in which the anti-diabetic component is in crystalline rather than amorphous form.

The crystalline aspect of NPH insulin may be responsible for an advantage inherent in the preparation in instances when use of both modified and unmodified insulin preparations is required. It could be hoped for example, that the simultaneous administration of 20 units of insulin mixed with 20 units of protamine zinc insulin would result in a lowering of blood-sugar levels similar to that produced by the injection of 20 units of insulin followed very shortly thereafter by the administration, at a different site, of 20 units of protamine zinc insulin. Unfortunately, in practice, such hopes are not realized, much of the quick-acting effect of the insulin being lost. On the other hand, when insulin and NPH insulin are mixed in a syringe for simultaneous administration, much of the quick action of the insulin is retained. This is evident from an experiment in which two mixtures were prepared as follows:

A. 2.0 c.c. insulin + 1.0 c.c. protamine zinc insulin.

B. 2.0 c.c. insulin + 1.0 c.c. NPH insulin.

In each case, preparations containing 40 units per c.c. were used. The resulting acidity if sample A was pH 6.5; that of sample B was pH 6.7. The samples were centrifuged and assays of the insulin content of the supernatant fluid of each sample were conducted. By use of the mouse method of assay it was possible to determine the relative values of each of the two supernatants in terms of quick-acting effect. It was found that the supernatant fluid from sample A contained only about 0.87 units per c.c., whereas that from sample B contained 17.2 units per c.c. It would be expected, therefore, that injection of a mixture prepared from unmodified insulin and NPH insulin would show evidence of much of the quick-acting effect of the insulin as well as the prolonged effects of NPH insulin.

SUMMARY

Some details pertaining to the composition and properties of NPH insulin are recorded. Relation of NPH insulin to other insulin preparations is briefly indicated.

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NPH INSULIN — A PRELIMINARY REPORT*

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SINCE the discovery of insulin by Banting and Best¹ in 1921, there have been many modifications in the form of insulin used in the control of hyperglycemia in the diabetic patient. Best² describes the ideal preparation as that which is only liberated when the blood sugar goes above the normal value. This ideal has not been reached but NPH[†] insulin is a welcome newcomer to the types available in Canada today. This preliminary report on the use of NPH insulin in juvenile diabetics is presented because this new type of insulin became generally available in Canada for the first time in November, 1950.

The chief distinction between protamine zinc insulin and NPH insulin is that the former is an amorphous material containing a variable quantity of protamine (1.25 to 1.5 mgm. per 100 units) which is sufficient to provide an excess while NPH insulin is a crystalline product in which the protamine is completely combined with insulin.

After injection the action of NPH insulin commences in approximately 2 hours, reaches a maximum³ in 10 to 20 hours and is complete in 28 to 30 hours. There is a definite need in the juvenile age group for a satisfactory method of obtaining 24-hour control by the use of one injection a day. The patients and their parents welcome it. The method must be simple and also

flexible enough to allow for easy adjustment in dosage because juvenile diabetics require frequent adjustment of their dosage to prevent glycosuria or hypoglycemia.

During the past two months, we have attempted to determine the value of NPH insulin in the control of hyperglycemia in 18 juvenile diabetic patients. Their ages varied from 3 to 14 years and the total daily insulin requirements from 10 to 80 units. During the trial period all patients were up and active and their diets were constant at the calculated amounts for their respective ages.⁴ All blood-sugar estimations were done on capillary blood by the Somogyi-Nelson⁵ method.

In this clinic most children have been controlled on a combination of protamine zinc insulin and unmodified insulin, given in separate injections before breakfast. In the present study when blood-sugar levels were within the normal range by this procedure a change was made to a single injection of NPH insulin. The suggested method of changing from the separate injections is to total the daily number of units of the two insulin preparations and to give that total amount in the form of NPH insulin in a single injection before breakfast.⁶

In 1949 Priscilla White⁶ reported the results of treatment with an insulin preparation similar to NPH insulin on 336 diabetic patients, 220 of whom were under 20 years of age. The composite blood-sugar curve of seven of her patients is shown in Fig. 1. In four cases of this series a similar effect was obtained, although in one of these the amount of NPH insulin required was much less than the combined total of protamine zinc insulin and unmodified insulin. However in two instances the results were quite the opposite and a high fasting blood sugar was obtained (Fig. 2). The converse was also seen in which early morning reaction necessitated reduction in the amount of NPH insulin.

*From the Wards and Laboratories, Hospital for Sick Children, and the Department of Paediatrics, University of Toronto, under the direction of Alan Brown, M.D., F.R.C.P. (Lond.).

†The NPH insulin used in this series was kindly supplied by Dr. A. M. Fisher of the Connaught Medical Research Laboratories, University of Toronto, Toronto, Canada.

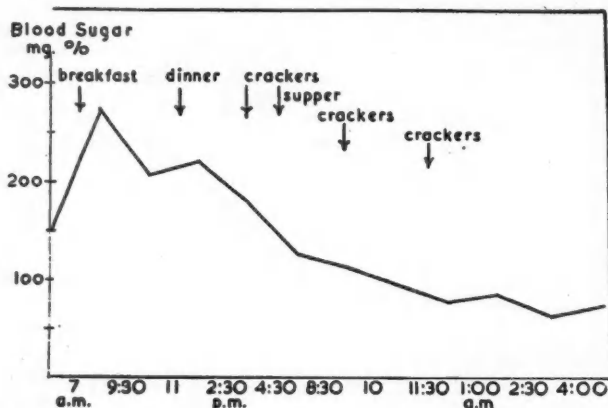


Fig. 1.—Composite curve of levels of capillary blood sugar of 7 patients using an insulin preparation similar to NPH insulin (P. White). Note the morning hyperglycemia and the tendency to nocturnal hypoglycemia.

In many cases of juvenile diabetes a tremendous variation is seen from day to day while on the same diet, exercise and insulin dosage. NPH insulin has apparently no advantage over other insulin preparations in this regard. Fig. 3 shows the daily variation in the blood sugar curve in an eight year old girl on the same daily diet, and exercise, using first of all separate injections of protamine zinc insulin and unmodified insulin and then single injections of NPH insulin. Early morning reactions necessitated reductions in dosage from 50 to 30 units.

Protamine zinc insulin contains an excess of protamine. When it is mixed with unmodified insulin some of the insulin is converted to a precipitated form. This excess of protamine is not constant from lot to lot and consequently anything up to 90% of the quick-action effect in these mixtures is lost. When NPH insulin is

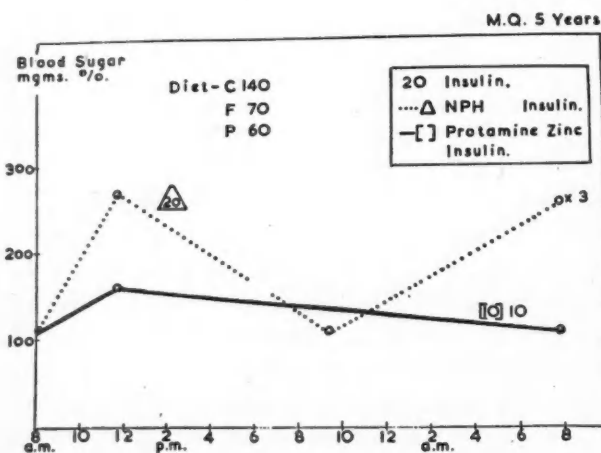


Fig. 2.—This case illustrates the high fasting blood sugar obtained on NPH insulin. Increasing the dose of NPH insulin led to the development of evening reactions.

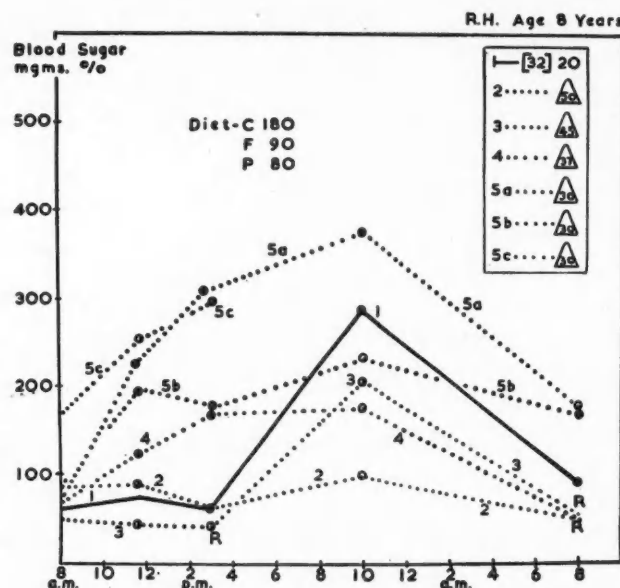


Fig. 3.—Sometimes less NPH insulin Δ is required than the total of protamine zinc insulin [] and unmodified insulin. Compare curve 1 with curves 2 and 5a. Early morning reactions necessitated further reductions in NPH insulin dosage. Finally it shows the marked daily variation that may be encountered on the same dosage, diet and exercises—see curves 5 a, b, c.

mixed with unmodified insulin 85% of the action of the unmodified insulin is preserved.³ This is a constant and not a variable effect. In five cases a mixture of NPH insulin and unmodified insulin was used. Fig. 4 shows the blood-sugar curves of a thirteen year old male diabetic. There was a marked rise in blood sugar for 48 hours after the change from the double injection (line 1) to the single injection of NPH insulin (line 2a). Line 2b represents the

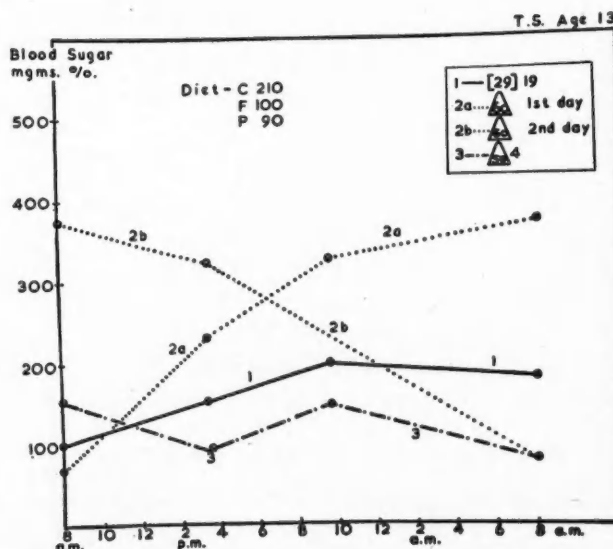


Fig. 4.—Showing the improved control of blood sugar which may be obtained by combining unmodified insulin with NPH insulin Δ (line 3).

return of the blood sugar levels to normal at the end of the second day using the same amount of NPH insulin. Since this boy continued to have glycosuria in the morning and/or early afternoon a small amount of unmodified insulin had to be added (line 3).

Similarly in four additional cases it was found necessary to add unmodified insulin to the NPH insulin to maintain normal glycaemia, especially before lunch. This combination showed better control than that obtained with the separate injections of protamine zinc insulin and unmodified insulin or the single injection of NPH insulin.

In two cases the use of NPH insulin had to be abandoned because glycosuria in the late forenoon as well as the afternoon was accompanied by nocturnal or early morning reactions. These two children were controlled more satisfactorily using relatively large amounts of unmodified insulin with small amounts of protamine zinc insulin. Both of these children were under six years of age. In White's⁶ series it was noted that very young children often require large amounts of quick-acting insulin and are not well controlled with modified preparations.

DISCUSSION

The importance of reducing the number of daily injections of insulin to the minimum compatible with adequate control of the blood sugar cannot be over emphasized. Everyone who deals with diabetics, especially child diabetics, is impressed with the importance of this fact.

NPH insulin with added unmodified insulin if necessary, aids in attaining this goal. However it must be emphasized that each patient's requirement of insulin must be considered as an individual problem both as regards the type of insulin and the amount required. Because the insulin requirements of the child vary markedly over short periods of time the preparation of mixtures of unmodified insulin and NPH insulin is not economical.

However, it is possible with care, to mix the required dose in a single syringe by first withdrawing the unmodified insulin and then the NPH insulin. Thus, necessary alterations in the dose of one or both insulin preparations is accomplished without waste.

NPH insulin, having a quicker and somewhat shorter action than protamine zinc insulin is

capable of controlling the blood sugar of a large percentage of diabetics by a single daily injection. Because it does not significantly alter the effect of added unmodified insulin, the use of mixtures has also proved satisfactory and enables one to employ the single injection technique. Since many patients show hyperglycaemia in the forenoon, rearrangement of the diet to contain less carbohydrate for breakfast and more for the evening meal may be necessary. However, it has been pointed out that this is not invariably the case and individual study of the patient is necessary.

SUMMARY

1. In 10 out of 18 juvenile diabetic patients, as good or better control was achieved by a single injection of NPH insulin as was possible with the double injection of unmodified insulin and protamine zinc insulin.

2. In 6 children a mixture of unmodified insulin and NPH insulin given in a single injection gave satisfactory control of hyperglycaemia.

3. In 2 children, both under 6 years of age, NPH insulin was not suitable because daytime hyperglycaemia was associated with nocturnal hypoglycaemia.

4. Generalization regarding NPH insulin should not be applied to individual patients. Each patient must receive the type and dosage of insulin most suited to his needs. Attention has been drawn to the variations in control of hyperglycaemia from patient to patient and even in the same patient from day to day.

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THE MODERN PHYSICIANS' OATH.—May I be inspired and strengthened by the grace and power within me to respect, trust and believe in my patient as a whole being—as an expression of spirit, mind and body.

Through my newer more comprehensive instruction, and my honest endeavour, may I learn to be concerned with his total welfare and get to know him thoroughly. Only then will I be able to help him in all departments of his life and guide him to health and normality.

REX WIGGINS, M.D.

THE EFFECT OF CORTISONE ON THE NEPHROTIC SYNDROME OCCURRING IN DIABETICS*

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REPORTS have been published concerning the treatment of nephritis in various phases of its natural history with ACTH and cortisone, and the most encouraging results have been obtained in patients with the nephrotic syndrome.¹ Three cases of the nephrotic syndrome complicating diabetes of long standing were selected for this investigation.

METHOD

All three patients were severe diabetics requiring more than 30 units of insulin a day. The diagnosis of the nephrotic syndrome was based on the degree and location of oedema in the absence of cardiac failure, the amount of albuminuria, the degree of hypoproteinæmia, and the scarcity of red blood cells and red blood cell casts in the urine. Systolic hypertension and retinopathy were present in two of the cases.

The patients were placed on a constant diet and in two patients, F.B. and H.G., the insulin dosage was altered periodically in an endeavour to control the level of fasting blood sugar and the degree of glycosuria. In the third patient, A.McK., the insulin dosage was maintained at a constant level except for one increase of 20 units at the end of the first week. He was allowed to run a consistently high level of fasting blood sugar and to lose a considerable quantity of sugar in the urine daily. Twenty-four hour urine specimens were collected and the content of reducing substances were estimated by a modified Somogyi method⁹ and the urinary protein by the method of Heller, McIntosh and Van Slyke.¹⁰

CASE 1

This 61 year old white male had had diabetes mellitus for the past seven years which had been controlled by diet and insulin. In the fall of 1949 he was admitted to Shaughnessy Hospital with oedema of both legs and over the sacrum. On examination at that time a hypertension of 190/90 was noted and small retinal hæmorrhages were present in both eyes. There was no evidence of cardiac enlargement. The neck veins were not engorged nor was the liver palpable.

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Urinalysis revealed specific gravity 1.015, no red blood cells or casts and 4 plus albumin. The total serum proteins were 4.6 gm. % with albumin 2.6 gm. % and globulin 2 gm. %. Serum cholesterol was 360 mgm. %. Non-protein nitrogen was 76 mgm. %.

In March, 1950, the patient was admitted to the Investigation Unit for a control period of five weeks. The following observations were made in this period: (1) There was considerable diminution in the oedema and only slight pitting remained in both ankles. (2) The diabetic state was found to be stable. Forty units of P.Z. insulin adequately controlled glycosuria and maintained the fasting blood sugar within normal limits. (3) The protein in the urine usually varied between 3 and 5 gm. daily. (4) The serum albumin varied from 2.6 to 3.3 gm. % and the serum globulin from 2 to 2.3 gm. %. (5) There was a normocytic anæmia with a hæmoglobin of 65%. (6) The serum cholesterol varied from 300 to 400 mgm. %. (7) The non-protein nitrogen varied from 40 to 90 mgm. %.

A total of 3.7 gm. of cortisone were given in a dosage of 50 mgm. intramuscularly twice daily for 37 days and the following observations were made:

1. There was no change in the blood pressure or in the eye grounds during treatment or subsequently.

2. There was a gradual increase in weight up to six pounds at the end of treatment. There was no change in the degree of oedema during treatment but two weeks subsequently an increase was noted affecting both the feet and sacral area.

3. Proteinuria increased during the second week of treatment to levels of 10 to 14 gm. daily and then fell to 6 to 10 gm. daily during the last week of treatment, subsequently falling to levels of 4 to 6 gm. for the month following treatment.

4. The serum albumin showed no change either during or following treatment.

5. The serum globulin fell to 1.4 gm. % during treatment and subsequently rose gradually towards its control level.

6. The hæmoglobin, the serum cholesterol and the serum non-protein nitrogen showed no appreciable change either during or after treatment.

7. There was a marked increase in insulin requirement during treatment; 90 units being required for the last two weeks of treatment. Two weeks following cessation of cortisone, the insulin requirement fell to 60 units.

8. Circulating eosinophils dropped to 50% of control values by the end of the first week of treatment, and for one month subsequently.

CASE 2

This 30 year old white male had had diabetes mellitus for the past thirteen years which had been controlled by diet and insulin. In 1945 he felt tired and ill and a diagnosis of nephritis was made by his doctor. He noticed no oedema of his ankles at that time but said he was puffy around his eyes. He made a rapid clinical recovery with rest and remained well until one year ago, since which time he had noticed gradual deterioration of vision in both eyes.

Six months ago he was admitted to hospital with gross oedema of the legs. He was discharged three weeks later after his diabetes had been adequately controlled and the oedema had disappeared. He was admitted to the Investigation Unit in August, 1950, and observed for a control period of three weeks. On examination there was oedema of both ankles and over the sacrum, which persisted throughout the control period. The heart was enlarged and blood pressure 190/120. There was no engorgement of the neck veins. The liver was not enlarged. Examination of left fundus revealed multiple hæmorrhages but no papilloedema. A massive hæmorrhage had occurred into the vitreous on the right side and prevented examination of the fundus.

Urinalysis revealed specific gravity 1.015, no red blood cells or casts and 4 plus albumin. The blood sugar and glycosuria were controlled with 74 units of insulin daily. The urinary protein varied between levels of 5 and 10 gm. daily. The serum albumin varied from 2.6 to 3.5

gm. % and the serum globulin from 2.3 to 2.2 gm. %. The cholesterol was 255 mgm. %. The serum non-protein nitrogen and haemoglobin were normal.

A total of 3.6 gm. of cortisone was given intramuscularly in a dosage of 50 mgm. twice a day for 36 days and the following changes were observed:

1. There was no change in blood pressure, haemoglobin or serum non-protein nitrogen either during or following cortisone therapy.

2. There was a considerable decrease in the amount of his oedema and by the end of the second week, pitting oedema remained only at his ankles. This persisted throughout the course of therapy and for a month subsequent to cessation. He lost ten pounds in weight during this course of cortisone.

3. Proteinuria rapidly increased and from the end of the first week averaged between 13 and 26 gm. daily. This subsided gradually in the post-cortisone period to a level of 8 to 16 gm. daily.

4. Serum albumin dropped gradually and at the end of the course of therapy it was 1.9 gm. %. It increased again in the next month to a level of 2.4 gm. %. The serum globulin showed no change.

5. The fasting blood sugar increased within two days of the commencement of cortisone and continued at a level between 200 and 500 mgm. The insulin was increased by 20 units after ten days with very little effect. The blood sugar started to fall eight days after cessation of cortisone and in twelve days the insulin was reduced to the control levels.

6. The degree of glycosuria paralleled the fasting blood sugar before, during and after the period of cortisone therapy.

7. The eosinophils dropped gradually throughout the course of therapy and touched the lowest level of 50% of control values one week after the end of treatment. They persisted at this level for the next month.

CASE 3

This 69 year old white male had had diabetes mellitus for 20 years which had been controlled with diet and insulin. He noticed swelling of his legs in December, 1949 and in January, 1950 was admitted to Shaughnessy hospital. On examination he was found to have pitting oedema of both legs and over the sacrum. There was no evidence of cardiac or hepatic disease. The blood pressure was 130/70 and apart from slight arteriovenous nicking, examination of the fundi was negative.

Urinalysis showed specific gravity 1.016, 4 plus albumin with a moderate number of hyaline and granular casts. There were no red blood cells. Serum albumin was 2.5 gm. %. Serum globulin was 2.9 gm. %. Serum cholesterol was 810 mgm. %.

In March, 1950, he was admitted to the Investigation Unit for a three week control period. During this period the following observations were made: (1) The oedema diminished in extent considerably. Only slight oedema persisted of both ankles. (2) The diabetic state was difficult to control and there was marked fluctuation in blood sugar and glycosuria while on a constant dosage of insulin. (3) Proteinuria increased from an initial level of 3 to 6 grams daily to 10 to 15 grams daily at the end of the control period. (4) The serum albumin varied from 2.6 to 3.2 gm. %; the serum globulin from 2.5 to 3.2 gm. %. (5) The serum cholesterol varied from 440 to 580 mgm. %. (6) The haemoglobin and serum non-protein nitrogen were within normal limits.

A total of 3.7 grams of cortisone were given in a dosage of 50 mgm. intramuscularly twice daily for 37 days and the following changes were observed:

1. There was no change in the blood pressure or in the fundi.

2. During the first two weeks there was a marked increase in the oedema of both legs and oedema reappeared over the sacrum. This was associated with a weight gain of 11 lbs. From the third week the oedema gradually decreased and at the end of cortisone therapy there was no oedema and the weight was 6 lb. less than at the time of starting cortisone. This state persisted for a month following treatment.

3. The proteinuria increased to 21 gm. daily by the end of the first week and then gradually fell to less than 0.2 gm. daily. It remained at this level for a month subsequent to treatment.

4. The serum albumin fell during the first three weeks of treatment to as low as 2.2 gm. % then gradually rose to 3.4 gm. % on the day treatment was discontinued and has risen subsequently to 4.9 gm. %. The serum globulin showed no significant change either during treatment or subsequently.

5. The serum cholesterol rose during treatment to as high as 920 mgm. %, and fell in the month subsequent to treatment back to its control levels.

6. No significant change in the serum non-protein nitrogen was observed.

7. The circulating eosinophils fell by more than 50% at the end of the first week of treatment and remained at this level both during treatment and for one month subsequently.

8. A moderate increase in insulin, up to 106 units, was required in the first two weeks to control the

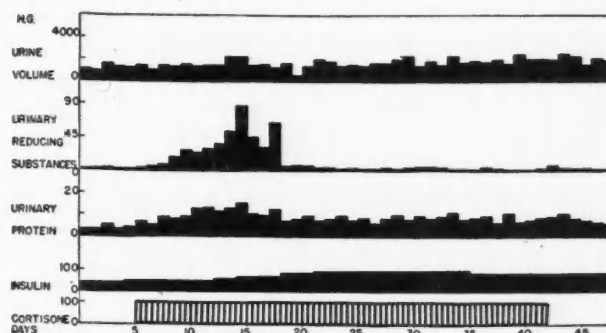


Fig. 1. (Case 1).—H.G., data charted represent 24-hour urine volume, the urinary reducing substances and urinary proteins measured in gm./24 hours.

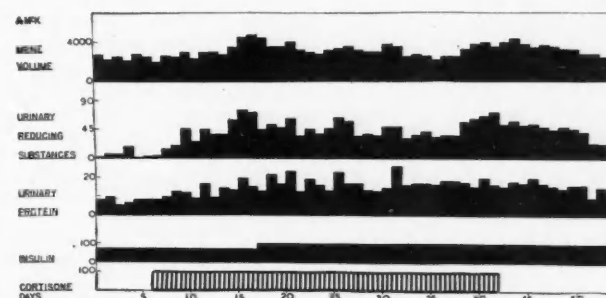


Fig. 2. (Case 2).—A.McK., data charted represent 24-hour urine volume, the urinary reducing substances and urinary proteins measured in gm./24 hours. Insulin and cortisone dosage is charted beneath.

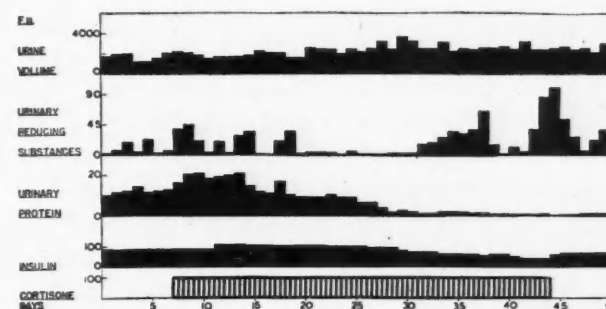


Fig. 3. (Case 3).—F.B., data charted represent 24-hour urine volume, the urinary reducing substances and urinary proteins measured in gm./24 hours. Insulin and cortisone dosage is charted beneath.

diabetic state but from the third week onward, the insulin requirement decreased so that at the termination of treatment and in the period subsequently, the patient required only 50 units.

Follow-up.—Two months later this patient suffered a relapse and became increasingly oedematous. On clinical examination, an additional finding was a normocytic anaemia with a haemoglobin of 50%. Occult blood was present in the stools. No lesion could be found in the gastrointestinal tract by radiography to account for this bleeding but it was considered most likely to come from an ulcer in a hiatus hernia. In view of this, no further cortisone was given. The patient became increasingly oedematous. The blood pressure rose to levels of 170/95 and nitrogen retention became apparent. He died four months after his admission.

Postmortem findings.—Grossly, the kidneys showed no apparent abnormality.

Microscopic examination showed the general architecture to be well preserved. The glomeruli showed dilatation of the glomerular spaces and many showed acellular, amorphous protein material. The glomerular capsules were not thickened and no crescents were seen. In a number of cases the necks of the convoluted tubules were dilated as they left the glomeruli. The glomerular tufts showed very little intercapillary hyaline, and spherical hyaline masses were not present. A number of the tufts showed adhesions to the capsule. Some of the glomerular tufts showed large dilatations of thin-walled blood vessels.

The tubules, in general, appeared to be dilated and many contained eosinophilic, acellular material. There was no frank tubular degeneration and fat stains of frozen sections showed no excess of stainable fat or anisotropic material. The interstitial tissue, generally, was not remarkable but a few areas showed collections of lymphocytes.

The arteries showed very little abnormality and no significant diminution of lumen. The afferent arterioles showed no abnormality.

The histological examination showed that the glomeruli were passing a high concentration of protein (without detectable numbers of red or white cells) into the glomerular spaces.

The very slight amount of hyaline change would indicate that hyalinosis itself was not the cause of the condition and the absence of round masses of hyaline made it possible to call this a case of the Kimmelstiel-Wilson syndrome. It falls into the group of glomerulonephritis of Ellis' Type II, in spite of the relatively slight degree of diffuse hyaline change in the glomeruli.

COMMENT

ACTH and cortisone have been given to patients with arthritis and diabetes by Brown *et al.*,² who showed that either extra insulin was required or the degree of glycosuria increased. They assumed that this was due to an increased amount of circulating adrenal cortical hormone and cited as proof the striking modification observed in the depancreatized animal when the adrenals are removed.³

In this study, one of the cases showed an immediate increase in the level of the fasting blood sugar and the others in the requirement for insulin. In the former case, despite the high fasting blood sugar, ranging from 500 to 700 mgm. %, only on one occasion were there ketones in the urine and then only in a small amount. This might be accounted for on the basis of

work by Kinsell,⁴ who showed that in fasting individuals the rate of formation of ketone bodies was diminished by the administration of ACTH and suggested that the intermediary metabolism of fat was altered and ketone bodies were not produced. One of the other two cases, however, showed a decreased requirement for insulin from the third week of treatment. The reason for this is not clear but several possible explanations are offered.

It has been shown that the injection of the adrenal corticotrophic extract of the pituitary into normal animals produced hyperglycaemia and glycosuria but that if the injections were continued, the hyperglycaemic effect was lost due either to an "anti-hormone" production or to hypertrophy of the islets of Langerhans.⁵ The theory that it may be due to an anti-hormone production is unlikely, for as yet there is no evidence of antibody formation to adrenal steroids.

Alternatively, recent work⁶ has shown that labile diabetics exhibit a non-specific diffuse abnormality of the electro-encephalogram which can be changed to normal if the patient is given dilantin. In addition, similar diffuse, non-specific changes have been shown in Addison's disease and these have reverted to normal with cortisone therapy. In this man, who was a labile diabetic, it may have been that cortisone produced some alteration in cerebral cortical activity which favourably affected the carbohydrate metabolism to produce a more stable form of diabetes. Finally, it is possible that the diminished insulin requirement is attributable to an improvement in the renal disease.

All three cases showed an increase in proteinuria that was persistent in two cases so long as cortisone was given. In the third, F.B., the increase was merely transient. This is in accord with experiments in the rat⁷ in which spontaneous proteinuria was decreased by adrenalectomy and increased by cortisone and appears to be due to a specific effect on the permeability of the glomeruli to albumin. An increase in proteinuria has also been reported by Burnett *et al.*,⁸ during treatment of a case of acute glomerulonephritis with cortisone.

SUMMARY

1. Three cases of the nephrotic syndrome occurring in diabetics of long standing have been treated with cortisone.

2. Initially, all three cases showed a decreased

carbohydrate tolerance as evidenced by raised blood sugar or increased requirement for insulin.

3. A decreased requirement for insulin occurred after three weeks in one patient. The possible reasons for this are discussed.

4. Increased proteinuria occurred in all patients.

5. There was no change in the nephrotic state in two of the patients.

6. In the third patient, in whom temporary improvement occurred, postmortem examination suggested that the patient was a chronic nephritic.

The authors wish to thank Dr. J. C. Colbeck, Director of Pathology, for the autopsy and histological studies.

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TRANSURETHRAL PROSTATIC RESECTION—1,000 CASES*

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THE Winnipeg General Hospital records on 1,000 consecutive private and staff cases of prostatism resected transurethraally by members of the Urological Department of the Winnipeg Clinic during a recent 5-year period constitute the basis of this study.

In this series carcinoma of the prostate and benign hypertrophy are compared in respect to the relative frequency, age incidence, duration of symptoms, associated diseases, operative blood loss, morbidity, and mortality.

Table I indicates the total number of patients operated on for bladder neck obstruction during this period. The percentage done transurethraally was 95.8%; suprapubic transvesical operation was used in 2.8%; while perineal prostatectomy accounted for 0.45%, the latter approach having been used for total removal of a localized carcinoma.

We found the average age to be 67 years (Table II). The youngest patient was 46 and the oldest 106. These two extremes in the age incidence were malignant, both being reported by the Department of Pathology as carcinoma, grade III. The patient of 106 years had an

orchidectomy at 107, and died at 109 years of age. The youngest is still living, 7 years after operation. Patients with carcinoma of the prostate fall into an older age group than those with benign obstruction.

TABLE I.

1,122 PROSTATIC OPERATIONS IN 5-YEAR PERIOD

Transurethraals	1,086	or 95.8 %
Suprapubics	31	or 2.8 %
Perineals	5	or 0.45%

1,000 TRANSURETHRAALS ANALYZED

Benign prostatic hypertrophy	861	or 86.1 %
Carcinoma	139	or 13.9 %

TABLE II.

AGE INCIDENCE

Oldest	106.0
Youngest	46.0
Average age	67.2
Average age of carcinoma	72.1
Average age of benign	66.3
46.5% Carcinoma between 70-80 years	
43.5% Benign between 60-70 years	

Approximately one-third of our cases suffered from associated disease of a type, or to a degree considered to be sufficient to influence operative risk and/or postoperative morbidity (Table III). Blood pressure over 150 systolic and 100 diastolic was recorded as hypertension. Coronary sclerosis was diagnosed on the history and electrocardiographic findings. Diabetes mellitus was diagnosed on the fasting blood sugar level and not on the presence of glycosuria alone. Clinical uræmia was found in surprisingly few cases even though it is known that many patients with

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prostatic obstruction are adjusted to high blood urea levels before seeking help. The miscellaneous group consisted of patients with carcinoma other than that of prostatic origin, senile cases, arthritics, hemiplegics, etc. There was a higher percentage of associated disease in those patients with carcinoma than in those with benign prostatic hypertrophy.

TABLE III.
ASSOCIATED DISEASE

Hypertension	159
Carcinoma	28
Benign	131
Coronary sclerosis	53
Carcinoma	12
Benign	41
Diabetes	19
Carcinoma	4
Benign	15
Clinical uræmia	13
Carcinoma	1
Benign	12
Stricture	9
Carcinoma	2
Benign	7
Miscellaneous	70
Total	323

Some prostatics are quite certain as to the date of onset of symptoms. Very many, however, are vague. This makes it difficult to obtain an accurate estimation of the duration of symptoms. A short history of under 6 months was given by one patient in five (Table IV). However, the greatest number gave a history of over one year. Our figures indicate that following the commencement of symptoms, those with carcinoma of the prostate seek treatment earlier than those with benign hypertrophy. This is what we might expect, as carcinoma of the prostate is not characterized by exacerbations and remissions as is benign hypertrophy.

TABLE IV.
LENGTH OF SYMPTOMS

	Carcinoma	Benign	Total
	%	%	%
6 months and under	25.0	21.5	22.0
Under 12 months	44.6	36.5	37.7
Over 12 months	55.2	63.5	62.5

We classify as acute retention those patients with acute, complete urinary retention as proved by history and catheterization, regardless of the interval since the last satisfactory voiding. We classify as chronic retention those who, when examined, had overflow incontinence or were having frequent small voidings in the presence of a large residual urine and a clinically dis-

tended bladder. One-third of our cases suffered from acute retention at least once. About 19% were admitted with acute retention and there was no apparent difference here between benign and malignant prostates. However, chronic retention was about twice as common in the benign group (Table V).

TABLE V.
ACUTE RETENTION

	Carcinoma	Benign	Total
	%	%	%
Once	28.2	26.7	26.9
More than once	7.6	8.6	8.4
Total	35.8	35.3	35.4
Admitted with	19.8	18.5	18.7
CHRONIC RETENTION	6.4	12.0	11.3

We consider normal blood urea nitrogen to be under 20 mgm. %. An unexpected finding was a normal blood urea nitrogen in over two-thirds of the cases. The average blood urea nitrogen was well within normal limits (Table VI). Those with carcinoma had urea retention more frequently than the benign cases.

TABLE VI.
BLOOD UREA NITROGEN

	Carcinoma	Benign	Total
	%	%	%
Under 20	57.4	68.7	67.4
Over 20	43.0	31.1	33.4
Over 40	36.4	4.6	9.4
Average B.U.N.	24.3	16.4	17.6

We routinely order either an intravenous pyelogram or a flat plate of the kidneys, ureters and bladder. Some of the referred cases come in with a "negative" x-ray report and without submitted films. These are not included in our x-ray survey. Detailed x-ray reports were available in 793 cases (Table VII). As might be expected, 92% of the flat plate films were negative. In 30% of the excretory urograms, no abnormality was noted. Because of the increasing frequency with which prostatic filling defects are now reported in intravenous urography, the latter figure is now much smaller. In 1.5%, upper urinary tract calculi were found, while 5% had vesical calculi found by x-ray and/or cystoscopy. Urinary tract stones were commoner in those with benign prostatism, while the reverse applied to prostatic calculi.

Hydronephrosis, unilateral or bilateral, secondary to bladder neck obstruction was demonstrated in 7% of the total cases (Table VIII). We had expected this figure to be higher. It

TABLE VII.
FINDINGS ON X-RAY — 793 CASES
PLAIN FILM — 127 I.V.P. — 666
CALCULI

	Carcinoma	Benign	Total
	%	%	%
Kidney and ureter	0.7	1.2	1.5
Bladder	0.7	4.6	*4.1
Prostate	12.9	5.6	6.7

* On cystoscopy, 5% cases had bladder calculi.

was more common with carcinoma due to the subtrigonal infiltration of the malignant process. A prostatic filling defect was demonstrated in most patients who had an intravenous pyelogram, being more pronounced in benign cases due to the more common intravesical projection of the gland. The frequency of vesical diverticula was taken from the x-rays and would no doubt be a much higher figure if their presence had routinely been noted on the operative report and if intravenous pyelograms or cystograms had been done on more of our cases. In the malignant cases, osseous, vertebral or pelvic metastases are reported only as those found on routine plain or I.V.P. plates. Evidence of bony metastases was found in 16.5%, approximately 90% of these being sclerotic changes, and 10% rarefying osseous changes.

TABLE VIII.
X-RAY FINDINGS CONTINUED

	Carcinoma	Benign	Total
	%	%	%
Hydronephrosis	14.2	5.8	6.9
Bladder filling defect	15.4	34.7	32.2
Pyelonephritis .....	..	..	0.5
Diverticula .....	..	..	4.3
Bony metastases	16.5	..	16.5

Admission urinalysis revealed pyuria in about one-third of the cases (Table IX). Haematuria was much less common. The criterion for these was the presence of 10 or more pus cells or red cells per high power field in centrifuged urine. A large percentage were negative for pus and blood. Those with benign prostatism had a higher incidence of negative urinalyses.

TABLE IX.
URINALYSIS

	Carcinoma	Benign	Total
	%	%	%
Pyuria	34.6	31.4	32.8
Haematuria	13.0	10.7	11.1
Albuminuria	38.4	26.4	28.2
Negative	34.6	43.9	42.5

Most of the cases were admitted with satisfactory haemoglobin levels (Table X). There was no difference between carcinoma and benign.

TABLE X.
HÆMOGLOBIN

Over 70%	93%
Over 80%	81%

The average weight of tissue resected was higher in benign cases due to the usually larger size of the prostate (Table XI). The better definition between the adenomatous tissue and the false capsule in benign hypertrophy makes wide resection possible, while in malignant disease the infiltration and fixation of the gland makes wide resection unnecessary.

TABLE XI.
AMOUNT TISSUE RESECTED

Average weight, 1,000 cases	21.0 gm.
Average weight carcinoma	15.8 gm.
Average weight benign	22.0 gm.
Maximum	107.0 gm.
Minimum	1.0 gm.

We measure operative blood loss with the colorimetric standards (15 gm. Hgb. per 100 c.c. blood) prepared by the Lamotte Chemical Company of Baltimore. The difference between blood loss in carcinoma and benign cases (Table XIII) is due to the smaller size of the gland, and the comparative avascularity of the former. We have found this estimation of great value as it enables loss to be replaced. In a small series of cases (30), we have estimated postoperative blood loss by the same method and have found the blood loss for the first 24 hours to be about one-third of that lost on the operating table.

TABLE XII.
OPERATIVE BLOOD LOSS 434 CONSECUTIVE CASES

Pathology	No. cases	Average loss	Most	Least
Carcinoma	70	46 c.c.	350 c.c.	5 c.c.
Benign	364	121 c.c.	1,250 c.c.	5 c.c.
Carcinoma	75%	Cases lost under 50 c.c.		
Benign	70%	Cases lost under 121 c.c.		

It was found necessary to resect more tissue before discharge on 9% of the cases in this series (Table XIII). Including those cases admitted with a history of having had a transurethral resection here or elsewhere, a total of 17.9% had more than one resection. Repeats were naturally more common in the carcinoma group, as the table indicates.

Postoperative complications, excepting those with fatal termination, are indicated in Table

TABLE XIII.
REPEAT OPERATIONS

	Carcinoma	Benign	Total
	%	%	%
Admissions for 2nd, 3rd, etc. . .	17.5	7.3	8.9
Repeats while in hospital . . .	9.9	7.5	9.0
Total repeats	27.4	14.8	17.9

XIV. Only hæmorrhage sufficient to necessitate readjustment of the Foley bulb and/or traction, or requiring transfusion and fulguration, is indicated here. "Immediate" hæmorrhage is that occurring within 48 hours of operation, while "delayed" is that occurring any time after this. The catheter was usually removed in 48 hours.

TABLE XIV.
POSTOPERATIVE COMPLICATIONS

	Carcinoma	Benign	Total
	%	%	%
Hæmorrhage:			
Immediate	0.7	1.3	1.2
Delayed	2.1	3.2	3.0
Total	2.8	4.5	4.3
Inflammatory	9.9	9.1	9.2
Cardiovascular	3.0	1.4	1.7
Pulmonary	1.5	0.67	0.80
Myogenic	2.3	3.0	2.9

Inflammatory changes include pyelonephritis, cystitis, peri-prostatitis, peri-urethritis, peri-urethral abscess and epididymitis. As some patients develop urogenital inflammatory complications after leaving the hospital, the figure for epididymitis would be higher if the follow-up records were included.

Cardiovascular complications include myocardial infarction, thrombophlebitis, pulmonary embolism and cerebrovascular accidents. Pulmonary complications include atelectasis and the pneumonias.

The term myogenic bladder was applied to those cases with a large amount of postoperative residual urine with or without difficulty in voiding and with neither obstructing tissue nor large diverticula on postoperative cystoscopy. These patients usually had a long preoperative history of chronic bladder distension.

Postoperative hæmorrhage was shown to be more common in benign cases for the same reason that operative blood is higher in these cases. Cardio-vascular and pulmonary complications were commoner in the malignant cases as might be expected in an older age group.

The intravascular hæmolytic syndrome resulting from prostatic venous absorption of hypotonic irrigating fluid accounted for 0.9% of the

deaths (Table XV). The carcinoma group had a 4.3% mortality compared to 1.5% in the benign group.

TABLE XV.
MORTALITY IN 1,000 CASES—1.9%

Intravascular hæmolytic syndrome	9 deaths
Miscellaneous causes	10 deaths
Benign	13 deaths
Carcinoma	6 deaths

Ten deaths from miscellaneous causes (Table XVI) bring the total mortality of 19, or 1.9%.

TABLE XVI.
MISCELLANEOUS CAUSES — 10 DEATHS

	No. days postop.
1. Chronic nephritis and uræmia	16
2. Pneumonia and cardiac failure	57
3. Pyelonephritis and coronary thrombosis	79
4. Bronchopneumonia and cardiac failure	30
5. Cerebral vascular accident	31
6. Chronic nephritis and uræmia	60
7. Bowel obstruction and cachexia	120
8. Coronary occlusion	3
9. Pneumonia following fracture hip (age 91) . .	51
10. Chronic nephritis and renal failure	60

For many reasons, the length of hospitalization is of interest to most patients. This is also of great interest to both hospital management and surgeon because of the current bed-shortage and long waiting list (Table XVII). Both the preoperative and postoperative hospital stay in this series is lengthy because of the lack of adequate convalescent and nursing home accommodation. This applies particularly to ward cases where patients must remain in hospital until they are quite well.

TABLE XVII.
PREOPERATIVE STAY

	Carcinoma	Benign	Total
	%	%	%
Under 1 week	43.3	58.5	56.1
Under 2 weeks	70.4	83.0	81.0
Under 3 weeks	85.8	90.8	90.2
Over 3 weeks	13.9	9.0	9.8

POSTOPERATIVE STAY

	Carcinoma	Benign	Total
	%	%	%
Under 10 days	24.4	29.8	29.0
Under 3 weeks	74.7	78.0	77.5
Over 1 month	7.8	7.2	7.3

The Stern-McCarthy, Nesbit and Thompson resectoscopes were used, with either the Bovie or the Wappler diathermy as the activating unit.

SUMMARY AND CONCLUSIONS

An analysis of the hospital records on 1,000 consecutive transurethral prostatic resections is presented. Age, history, associated disease, findings on the routine investigation of the case, amount of tissue resected, operative blood loss, complications, mortality and period of hospital stay are discussed.

Interesting comparisons are made between malignant and benign prostatic obstruction. In general, the former are forced to seek help sooner, have more associated disease, more genito-urinary pathology and a higher mortality rate. It is difficult to say how much of this is due to the age differential. Of interest is the higher incidence of prostatic calculi in the carcinomatous cases.

We wish to express our thanks to Dr. H. D. Morse for permission to use the records of the Staff cases and of his own private cases, also to the staff of the Record Room at the Winnipeg General Hospital for their valuable assistance.

RÉSUMÉ

Les auteurs font une analyse de 1,000 cas de prostatectomies transurétrales pratiquées au cours d'une période de cinq ans au Winnipeg General Hospital. On y compare le cancer de la prostate et l'hypertrophie de l'organe par rapport avec l'âge des malades, leur histoire de cas, la fréquence de la maladie, la durée des symptômes, les affections associées, l'hémorragie opératoire, la morbidité et la mortalité.

L'âge moyen des malades, du plus jeune de 46 ans au plus âgé de 106 ans, était de 67 ans. Un tiers d'entre eux souffraient d'une maladie associée, notamment d'hypertension dépassant en moyenne 150 pour la maxima et 100 pour la minima; suivaient la sclérose coronarienne, le diabète et l'urémie. Dans la grande majorité des cas, c'était depuis plus d'un an environ que les premiers symptômes de rétention, aiguë ou chronique, avaient fait leur apparition.

D'intéressantes comparaisons sont faites entre les tumeurs d'origine maligne et celles purement bénignes. Les premières s'accompagnent davantage de maladies associées, ont une pathologie génito-urinaire et un taux de mortalité plus élevés; on y rencontre également plus de calculs de la prostate. Cependant l'hypertrophie simple se complique plus fréquemment d'hémorragie post-opératoire, du fait que les déperditions de sang sont aussi plus élevées au cours de l'opération. Enfin, à cause du manque général de maisons de convalescents, la durée de l'hospitalisation, tant avant qu'après l'intervention, s'avère toujours plus longue, un état de choses que déplorent aussi bien les malades que la direction de l'institution.

THE INTRAVENOUS USE OF ACTH*

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AT the second clinical ACTH conference, Gordon¹ reported that much greater degrees of adrenal cortical stimulation were obtained by the use of ACTH administered intravenously than occurred when the same material was administered by the intramuscular route. The criteria used to measure adrenal cortical stimulation consisted in a determination of the amount of the urinary 17-ketosteroids and cortin excreted in addition to observations on the number of circulating eosinophils. It has been suggested that the reason for the discrepancy between the results achieved by these two routes of administration is to be found in the fact that muscle tissue contains enzymes responsible for the destruction of the physiological activity of ACTH. This would, of course, suggest that the intramuscular route is

an inefficient method of administering the hormone.

The study to be reported was undertaken in an effort to discover the most effective means of utilizing ACTH.

Method.—Two patients were chosen for this study who were hospitalized because of disability resulting from rheumatoid spondylitis. There was no evidence of activity of the disease in either patient.

In both patients, the fasting level of circulating eosinophils² was determined each morning and the daily amount of urinary 17-ketosteroids excreted was measured using the method of Callow and his co-workers.³

ACTH (Armour) Lot number J20307 was used throughout the study. The doses referred to are expressed in terms of equivalence to the Armour Standard L.A.-1.A.

After a suitable control period, the first patient, R.S., received ACTH intravenously over a 24 hour period by continuous drip. The ACTH was dissolved and added to 2,000 c.c. of 5% glucose. This was given at a constant rate of about 20 drops per minute, the total dose being delivered over 24 hours. This procedure was carried out at 5 day intervals and the amount of ACTH administered was varied on each

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occasion so that observations were made using 0, 2.5, 5, 10, 20, 40, 80 and 160 mgm. of ACTH respectively. Finally, 20 mgm. were administered every 6 hours intramuscularly. The results are shown in Fig. 1.

The second patient, B.B., was given a constant amount of ACTH, 20 mgm., but the material was administered in 5% glucose over varying lengths of time. The volume of 5% glucose was such that 20 drops were administered per minute in each instance and the time of administration was 1 minute, 3, 6, 12, and 24 hours respectively. The results are shown in Fig. 2.

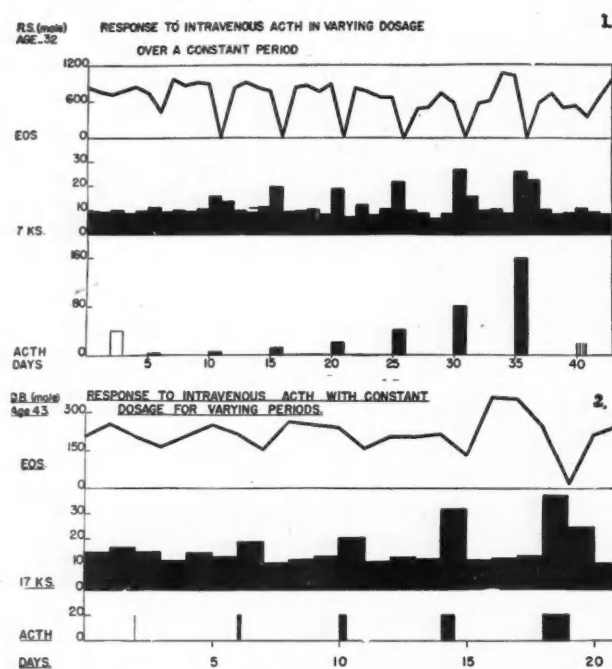


Fig. 1.—Doses of ACTH are shown on the bottom line. From left to right they represent intravenous administration over 24 hours, of 0, 2.5, 5, 10, 20, 40, 80, and 160 mgm. respectively. The 4 single lines at the extreme right represent intramuscular administration of 20 mgm. of ACTH q.6 h. for 4 doses. Fig. 2.—20 mgm. of ACTH administered intravenously over varying lengths of time, from left to right 1 minute, 3, 6, 12, and 24 hours respectively.

Results.—It will be seen from Fig. 1 that when an intravenous alone was given over 24 hours, no change occurred in the level of the circulating eosinophils and there was no increase in the excretion of 17-ketosteroids. When 2.5 mgm. of ACTH were added to the intravenous, there was a drop in the eosinophils to approximately half their control level at the end of the 24 hour period. There was only a slight rise, amounting to some 2 mgm., in the amount of 17-ketosteroids excreted in the 24 hour period. With 5 mgm., the eosinophils virtually disappeared and the same occurred

at all the subsequent dose levels employed. As regards 17-ketosteroid excretion, there was a significant increase with 5 mgm. of ACTH, but with 10 mgm., the excretion doubled and this was observed with administration of 20, 40, 80 and 160 mgm. also. In fact, with all these dosages, there did not seem to be much further increase in 17-ketosteroid excretion in contrast to the substantial dosage increases.

Equally striking was the rapid return of 17-ketosteroid excretion to control levels on the day following ACTH administration. Only when 80 and 160 mgm. of ACTH were used was there any tendency for the 17-ketosteroid excretion to remain sustained and even in these cases it was only apparent for one day. When a total of 80 mgm. of ACTH was administered intramuscularly in four divided doses, only a minimal increase in 17-ketosteroid excretion occurred and the eosinophils fell to slightly less than half their normal level.

In all instances, the rapid return of the eosinophils to control levels was a notable feature.

When 20 mgm. of ACTH were administered intravenously over varying lengths of time, no significant change occurred in the eosinophil level till the period of administration was 24 hours (see Fig. 2). They then almost disappeared. It should be noted, however, that this only refers to the fasting eosinophil count performed each morning. When the count was determined at the end of the 3, 6 or 12 hour period, there was a marked reduction in eosinophils but this effect was not sustained for 12 hours. When, however, the ACTH was given over a period of one minute, no change was detected in the eosinophil count determined 4 hours later.

As regards the 17-ketosteroid excretion, this seemed to bear a distinct relationship to the length of time over which the ACTH was administered. The greater the length of time of administration, the greater was the 17-ketosteroid excretion. It should perhaps be noted that in all cases the 17-ketosteroids were determined on 24-hour urine collections. No data are available as to whether the rate of 17-ketosteroid excretion would be comparable if measured only over the periods during which ACTH was being given.

DISCUSSION

As a result of these data, two salient features emerge. First, there is a minimum dose of ACTH

which when administered intravenously over a 24-hour period exerts a maximum or near maximum degree of adrenocortical stimulation. From the data shown in Fig. 1, this amount is about 10 mgm. From this it follows that any excess of ACTH over and above this amount is wasted. The fact that such a small amount of ACTH is capable of so great a degree of adrenal stimulation when given intravenously as compared to the relatively smaller effects of intramuscular dosage is certainly compatible with the suggestion that some of the physiological activity of ACTH is destroyed when given by the latter route. From the data shown, 20 mgm. of ACTH given intramuscularly every 6 hours has an effect comparable to that observed when 2.5 mgm. is given by continuous intravenous drip over a 24-hour period.

The second point is that the longer a given stimulus is applied, the greater is its effect. The data in Fig. 2 make this clear. Evidence of sustained adrenocortical stimulation is present only when the material is given over a 24-hour period. There is no evidence, however, as to whether administration of the ACTH over periods of time intermediate between 12 and 24 hours would result in sustained adrenocortical stimulation. Certain practical considerations arise as a consequence of these observations.

In the light of existing knowledge, it seems reasonable to suppose that the beneficial effects which occur with ACTH therapy in a number of conditions are attributable in some way to the effect of increased amounts of circulating adrenal steroids. It would also seem reasonable to suppose that the more constant the increase in the level of these steroids in the circulating blood, the more rapidly the desired clinical effect will be achieved. From the data of Fig. 2, it is logical then, that treatment should be maintained for 24 hours. Regarding dosage, in view of the expense of the material, the use of the

minimum amount of ACTH that will be effective is obviously desirable, especially if increased dosage does not result in a further increase in the amount of circulating steroids.

From 10 to 20 mgm. of ACTH per 24 hours would seem to be a satisfactory dose to employ. This dosage has been used in the treatment of a number of cases with satisfactory results. This will be the subject of a future communication.

SUMMARY AND CONCLUSIONS

ACTH has been administered intravenously to two individuals on a number of occasions. In the first patient, increasing dosages were employed over a constant period of 24 hours. In the second patient, a constant dosage of 20 mgm. was used but it was administered over varying lengths of time. The following conclusions were reached:

1. The degree of adrenocortical stimulation attained by the continuous intravenous administration of ACTH is considerably greater than that achieved by use of the intramuscular route.
2. A maximum degree of adrenal cortical stimulation occurs with a relatively small dose of ACTH (approximately 10 mgm.) given continuously intravenously over a 24 hour period.
3. The degree of adrenocortical stimulation measured over a 24 hour period is proportional to the length of time over which the ACTH is given, being maximal, in fact, when ACTH is administered over the whole 24 hour period.
4. The continuous intravenous administration of ACTH is the most efficient and economical method of achieving adrenocortical stimulation.

The authors wish to express their gratitude to Miss Maureen Bell, Miss Blanche Husband and Mr. Roy Kelsberg of the laboratory staff for their technical assistance.

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PALLIATIVE GASTROSTOMY FOR INOPERABLE CARCINOMA OF THE OESOPHAGUS*

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THE modern approach to carcinoma of the oesophagus has, of itself, limited to a great

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degree the use of palliative gastrostomy for this disease. The mortality rate for resections, and even palliative resections, has been reduced to reasonable figures in the better clinics. The approach therefore, in all but the most unfavourable cases, is by resection.

It has been my impression, however, that in the past fifteen years the operation of palliative gastrostomy has been the almost automatic sequel to the diagnosis of "inoperable" carci-

noma of the œsophagus. The particular case which led to my review of this operation occurred in 1949. This unfortunate man had a carcinoma of the mid-œsophagus with involvement of both recurrent laryngeal nerves, and could not swallow even his own saliva. He was having a great deal of constricting chest pain, and, in all, was utterly miserable. Upon request by his physician I performed a Janeway type gastrostomy, the course of which was uneventful, and the wound healed well.

After his death, which occurred in due course, I could not feel satisfied that I had helped this man in any way. His pain was just as bad, and I had only added the pain of a laparotomy wound. He still drooled all his saliva by mouth, and he was always thirsty. His emaciation progressed, and panicky bouts of nocturnal dyspnoea continued, presumably due to salivary aspiration during sleep. On top of all this, some regurgitation at the gastrostomy opening produced a marked excoriation of the skin, and this had to be dressed almost hourly due to spill.

The following questions therefore presented themselves to mind: (1) Does gastrostomy prolong life? (2) Is any one method of enterostomy superior to another in comfort or in prolonging life? (3) What are the indications for gastrostomy?

A review of the records at the Central Division of the Montreal General Hospital was made for the years 1935 through 1948, and 103 cases of carcinoma of the œsophagus were found. Of these 103 cases: 72 had a gastrostomy or enterostomy; 7 refused a proffered gastrostomy; 8 had x-ray therapy only; 16 had no active therapy.

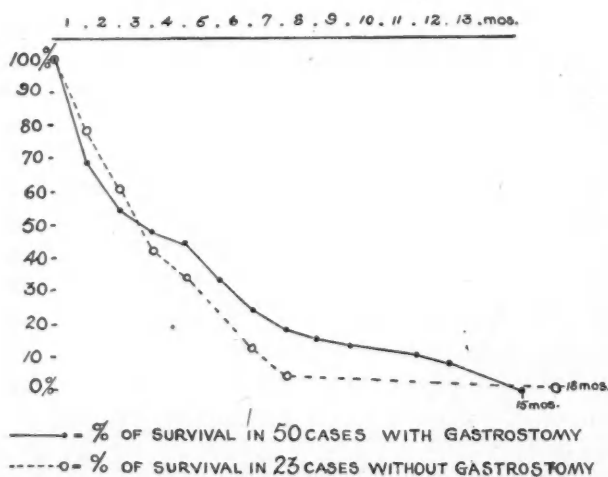


Fig. 1

Of the 72 gastrostomies, 17 were definitely preparatory to the attempted operative removal of the tumour, and these 17 are not considered further in this report.

There were, therefore, 55 palliative gastrostomies performed, in the belief that the patient was being assisted to bear his misery, and as a method to prolong life. Of these 55 cases, 23 died in hospital without discharge following operation (42%). Of these 23 cases, only 8 survived over 30 days, and the average survival time in the group of 23 was 23 days.

Thirty-two cases left hospital alive. 27 of these were traced to death, and 5 could not be traced. In this group of 27 cases the average survival time was 202.6 days.

But, put another way, of 50 cases with palliative gastrostomy traced to death, the average survival time was 120 days. Whereas of 23 cases without gastrostomy (x-ray therapy or nil), the average survival time was 111 days.

In other words, in this series of 100 odd cases, 50 patients were exposed by a laparotomy to a 42% hospital mortality risk to increase the average survival time by 9 days!

The longest average survival time, 126 days, occurred in the group of 7 cases who refused a proffered gastrostomy!

CONCLUSIONS

1. Gastrostomy does not prolong life in cases of advanced "inoperable" carcinoma of the œsophagus.

2. In my opinion, gastrostomy does nothing but add to the burdens of a very miserable patient.

3. In my review no advantage for any particular type of gastrostomy could be detected.

4. It is sometimes said: "The patient is going to die anyway, so the operative risk does not matter". This is in spite of such factors as pre-operative apprehension; painful laparotomy wound; skin excoriation; wound infection; blocking of tubes; repeated painful dressings, etc. If one wishes to enter the problem of euthanasia—and I do not—let us declare it so and then find a better method.

5. Some authors state that gastrostomy is indicated only when fluids cannot be taken by mouth. Certainly there is no indication when fluids by mouth can be tolerated. I personally feel after this survey that when fluids by mouth cannot be tolerated the blessed end is near enough without direct assistance.

THE MANAGEMENT OF SURGICAL SHOCK IN THE POOR RISK PATIENT*

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A SURGEON very often uses the term "poor operative risk". He may be concerned with some coexisting lesion in a surgical patient such as cardiovascular disease which obviously adds to the risk of surgery. Sometimes, however, he merely knows from experience that, even though there is no other complicating factor, the patient has become debilitated from his disease and that he is likely to enter a state of shock during a major operative procedure. Induction of anaesthesia alone may precipitate a profound fall in blood pressure which may delay or necessitate termination of the operation.

The purpose of the present investigation has been to study this apparent increased susceptibility to surgical shock in a group of debilitated, poor risk patients. Haematological studies and blood volume determinations have been made, and the clinical behaviour of these patients on the operating table has been observed. An attempt has been made to explain some of our findings on the basis of intravascular agglutination of erythrocytes with an associated increased destruction of red cells by the liver.

The occurrence of a reduced blood volume in nutritional deficiency¹ and chronic wound infections² has been recognized for several years. Recently Clark *et al.*³ have made an important contribution by demonstrating a relationship between low blood volume and what they have called "chronic shock". They coined this term to identify a syndrome of weight loss, decreased blood volume, decreased blood proteins and increased interstitial fluid; and they advised adequate preoperative blood transfusions in the chronically ill.

PART I.

The first part of this study was designed to examine current views regarding blood volume deficits in debilitated poor risk patients.

SELECTION OF CASES.

All cases selected for study were surgical patients suffering from a chronic disease. The

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majority of these were malignancies and chronic infections. It was considered important to choose patients for our blood volume estimations who were in a relatively stable state. Cases with a superimposed condition, such as an acute suppurative process, a recent bowel fistula, or a recent haemorrhage (in spite of replacement transfusion), were excluded. These more acute processes in our experience appear to reduce the reliability of the Evans blue test.

The patients that were considered as poor operative risks showed marked disability, apparently due to their disease, which limited their activity. Weight loss was evaluated in each case as follows. The patient's "usual weight" was determined from as reliable a source as possible. Present weight was subtracted and any loss of weight was felt to be significant when it developed from a previously stable level during the duration of the disease, which was usually under nine months. Diseases in which weight loss could be attributed to dehydration, from intestinal obstruction, or other such causes, were not studied. Very obese patients were excluded.

METHODS

The blood volume deficit of a poor risk patient was determined by first of all calculating his normal volume. To do this the figure 38.6 c.c. per pound, used by Noble and Gregersen⁵ to calculate blood volume, was multiplied by the patient's usual or normal weight. His actual blood volume was then estimated by the Evans blue method and the difference represented the blood volume deficit.

To illustrate this: a patient whose usual weight 4 months ago was 150 lb. is now debilitated, weighing 135 lb.

Calculated normal blood volume (150 x 38.6) .. 5,790 c.c.
Estimated present blood volume (Evans blue) 5,070 c.c.

Blood volume deficit 720 c.c.

Blood volume has been determined by a minor variation of the method described by Noble and Gregersen.⁴ With the patient in a basal state a sample of blood was obtained and a known volume of dye (T-1824, Warner Institute for Therapeutic Research, New York) was injected from a calibrated 5 c.c. syringe. Three blood samples were collected then at accurately noted intervals of about ten minutes. Coagulation was prevented with heparin and haemolysis avoided by careful handling. Two c.c. of plasma were diluted with four c.c. of saline and read using the undyed sample as a blank. A filter transmitting maximally at 620 m μ was employed in an Evelyn Colorimeter (Rubicon Co., Philadelphia).

A standard curve was prepared for each new lot of dye by dilution with 0.9% saline to concentrations of 2, 4, 6, 8, 10, 12 and 15 μ g. per c.c. Two c.c. of each dilution were treated with 4 c.c. of a 1:1 mixture of normal plasma and saline. The resultant transmission readings were plotted against dye concentrations and the curve obeyed Beer's law over the range employed.

The dye concentration found in the plasma was plotted for the 10, 20 and 30 minute specimens and the curve extrapolated to zero time. The figures so obtained, in μ g. per c.c. was divided into μ g. of dye injected to

give the plasma volume. Blood volume = plasma volume \times 100/100—haematocrit. In 30% of cases when the three dye values were plotted the points fell almost on a straight line. In another 30% the deviation was such that a line could be placed without difficulty. In 40% of cases, however, one or other of the three points was markedly aberrant and here a line was extrapolated through the two points which was closely approximated an "average slope" obtained from other patients in the series. This slope was determined from the estimations in which all three points fell on a straight line. The rate of disappearance of the dye ranged from 0.18 to 1.10 $\mu\text{g.}/\text{c.c.}$ in 30 minutes; all but two of the results were between 0.33 and 0.90, and the average was 0.65 $\mu\text{g.}/\text{ml.}/30$ minutes. This corresponds to a fall of roughly 15% per hour, a rate two or three times greater than the average noted by others. It may be that this is a characteristic of the debilitated patient, because the steepest slopes occurred in the cases with the largest blood volume deficits and disappearance of the dye was slower in normals.

Hæmatocrit values were obtained using Wintrobe tubes in duplicate and centrifuging for 45 minutes at 3,000 r.p.m. They were not corrected for plasma trapped in the packed cell layer.

The hæmoglobin was determined by the method of Evelyn⁶ and serum protein by the method of Gornall *et al.*⁷

An indication of the reliability of the method is given by the following results obtained in repeat estimations on the same patient a few days apart:

Mr. W. (1) 5,790 c.c. (2) 5,835 c.c. Difference 45 c.c.
Mr. B. (1) 4,985 c.c. (2) 5,045 c.c. Difference 60 c.c.

Our calculation of normal blood volume was checked against the estimated volume in a normal healthy individual.

Estimated (Evans blue test) 5,305 c.c.
Calculated (135 lb. at 38.6 c.c./lb.) 5,215 c.c.

Difference 90 c.c.

OBSERVATIONS

Twenty-five estimations of blood volume have been carried out in the type of debilitated patients described; "ideal" normal blood volumes have been calculated from their "usual weight", and the blood volume deficits determined. The following table (I), for the sake of brevity, shows figures from only ten cases, six of them debilitated.

On completion of this study we were surprised to find a rather close relationship between weight loss and blood volume deficit. This has been represented graphically (Fig. 1) and to

complete the graph a few normals and cases with minimal debility have been included.

This graph would suggest that the blood volume deficit in a debilitated patient may be calculated roughly at 50 c.c. deficit per pound of weight loss. Perhaps the explanation for this relationship is to be found in the basis for selecting cases. If, for example, those cases in which weight loss was due in part to severe dehydration had been included, this linear relationship would very likely not have been obtained.

One case of interest was a girl with severe bronchiectasis of fifteen years' duration. Her best weight was 102 pounds and her preoperative weight of 95 pounds had been stable for eight years. The estimated blood volume in this case showed no significant deficit which would suggest some sort of accommodation to this long standing disease.

Whether it is correct to use the "usual weight" as a means of calculating normal blood volume of debilitated patients has been questioned. This study is based on the premise that the capacity of the vascular tree does not decrease appreciably during the period of a few months to a year in which the patient has been losing weight. In an effort to substantiate this view five debilitated patients with low preoperative blood volume estimations were retested at periods of 4 to 18 months after surgical treatment of the disease process. Two of these were cases of carcinoma with secondary metastasis. Surgery in these cases did not eradicate the disease and postoperative blood volume estimations showed a slight increase in blood volume deficit. The three cases clinically cured all showed an increase in blood volume approaching the calculated normal. This took place before their return to usual weight had begun. This has been described by Clark *et al.* The following is an example:

TABLE I.

Case	Diagnosis	Weight loss	Blood volume		
			Calculated normal	Actual	Deficit
K.	Ingrown toenail	0 lb.	5,215 c.c.	5,305	+90
I.	Peptic ulcer	6	4,556	4,395	-161
M.	Peptic ulcer	11	5,015	4,807	-208
H.	Carcinoma colon	12	4,717	4,393	-324
D.	Carcinoma lung	15	6,375	5,476	-899
T.	Carcinoma rectum	30	7,141	6,126	-1,015
W.	Carcinoma stomach	30	6,182	4,578	-1,604
D.	Hodgkin's	64	9,180	6,183	-2,997
McD.	Carcinoma stomach	64	7,344	4,330	-3,014
C.	Chronic cholecystitis, cholangitis and pancreatitis	77	7,344	3,673	-3,671

TABLE IA.
MR. T. CARCINOMA OF RECTUM

	Weight	Calc'd normal Bl. Vol. c.c.	Est'd Bl. Vol. c.c.	Deficit c.c.
Usual.....	185	7,141	—	—
8/12/48.....	155	—	6,126	1,015
14/12/48.....	(operation)	—	—	—
18/4/49.....	156	—	6,585	555

MISLEADING BLOOD DETERMINATIONS

Probably one reason why surgeons have not suspected that such a profound physiological disturbance exists in debilitated patients is because the routine blood examinations one uses in hospital are often reported to be normal. We have been taught to feel relatively secure with a haemoglobin and blood protein estimation within normal limits in our preoperative patients. It is easily understood, however, that with a reduction in the total circulating blood volume which comes with a debilitating chronic disease, all the elements of the blood may be reduced in proportion, thus maintaining levels of protein and haemoglobin which are often within normal limits.

Table II shows the average figures for the seven most debilitated patients. The figures for individual cases varied widely. Some of them had a haemoglobin as low as 50%. Undoubtedly a degree of dehydration did exist in some of the seven patients but these average figures, lying within a reasonably normal range, demonstrate the unreliability of these routine tests. The marked average weight loss and the calculated blood volume deficit emphasize the degree of debility in these cases. From a summary of all cases, we have found the haematocrit value to be a somewhat more reliable index of red cell mass than the haemoglobin estimation.

TABLE II.
MISLEADING BLOOD DETERMINATIONS
(Average of 7 poor risk patients)

Average weight loss.....	43 lb.
Average haemoglobin.....	86%
Average haematocrit.....	39% cells
Average total serum protein.....	6.4 gm. %
Average deficit in blood volume.....	2,011 c.c.

INTRAVASCULAR AGGLUTINATION OF ERYTHROCYTES

The capillary bed of the scleral conjunctiva has been examined microscopically in over 100 humans as part of a separate project to study

the phenomenon of intravascular agglutination of erythrocytes.^{8,9} These examinations were conducted upon normals and in a variety of disease states, including many of the clinical cases in this study. The blood flow through the small vessels and capillaries of a normal, healthy individual is a rapid free flowing stream in which the red cells remain discrete. The surgical patients suffering from weight loss and reduced blood volume consistently showed marked clumping of red cells or intravascular agglutination with the slow irregular flow described as "sludging". Many vessels were static, filled with red blood cells, and there was an accompanying conjunctival oedema.

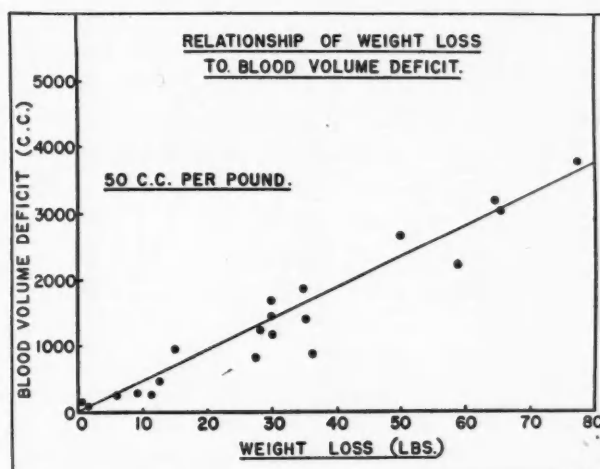


Fig. 1

SUMMARY (PART I.)

It would seem that poor risk surgical patients, suffering from a chronic disease with debility and recent weight loss, develop a reduction in their circulating blood volume. The deficit may be as great as 50% and appears to be related to the degree of debility and weight loss. A linear relationship between blood volume deficit and weight loss has been obtained in a selected group of patients suggesting a 50 c.c. deficit per pound of body weight loss.

The usual preoperative laboratory estimations of serum protein and haemoglobin may be within normal limits in the presence of a severe blood volume deficit.

Intravascular agglutination of erythrocytes or sludging of the blood has been observed in these chronic disease states.

PART II.

The second part of this study was designed to investigate the surgical importance of reduced blood volume in poor risk patients. We

have attempted to determine how important it is to replace this deficit with preoperative transfusions by studying the tolerance of these patients to major operative procedures.

Does the vascular tree shrink or does it retain its original capacity and accommodate to its new reduced blood volume by neurogenic constriction of the vessels, as in the early stages of shock?

SELECTION OF CASES

Forty-one cases were selected upon whom major operative procedures had been performed. Cases were excluded which had: (a) gross hæmorrhage preoperatively; (b) gross hæmorrhage during operation; (c) a complicating disease.

These 41 cases were divided into: (1) non-debilitated, in which the disease had not affected their routine of living; (2) debilitated, as judged by weakness, emaciation and recent weight loss. The degree of debility was graded or assessed by the manner in which it curtailed the patient's activity. Table III illustrates this:

It can be judged that the 4th and 5th degree

TABLE III.

ASSESSMENT OF DEBILITY

Degree	Activity
1	At work with disability
2	At work part time
3	Confined at home
4	In bed part time
5	Confined to bed

patients, confined to bed altogether or part time because of weakness, represent a severe degree of debility.

The operations were all major procedures of the order of gastrectomies and abdominoperineal resections. The anæsthetic used for all but a few was intratracheal ether.

OBSERVATIONS

Before analyzing the 41 cases and tabulating their preoperative blood transfusion therapy, both debilitated and non-debilitated cases were divided into two groups: those who did not develop shock during the operation, and those who did, as evidenced by a serious fall in blood pressure, usually to levels below 85 mm. of mercury. Table IV shows the results of this

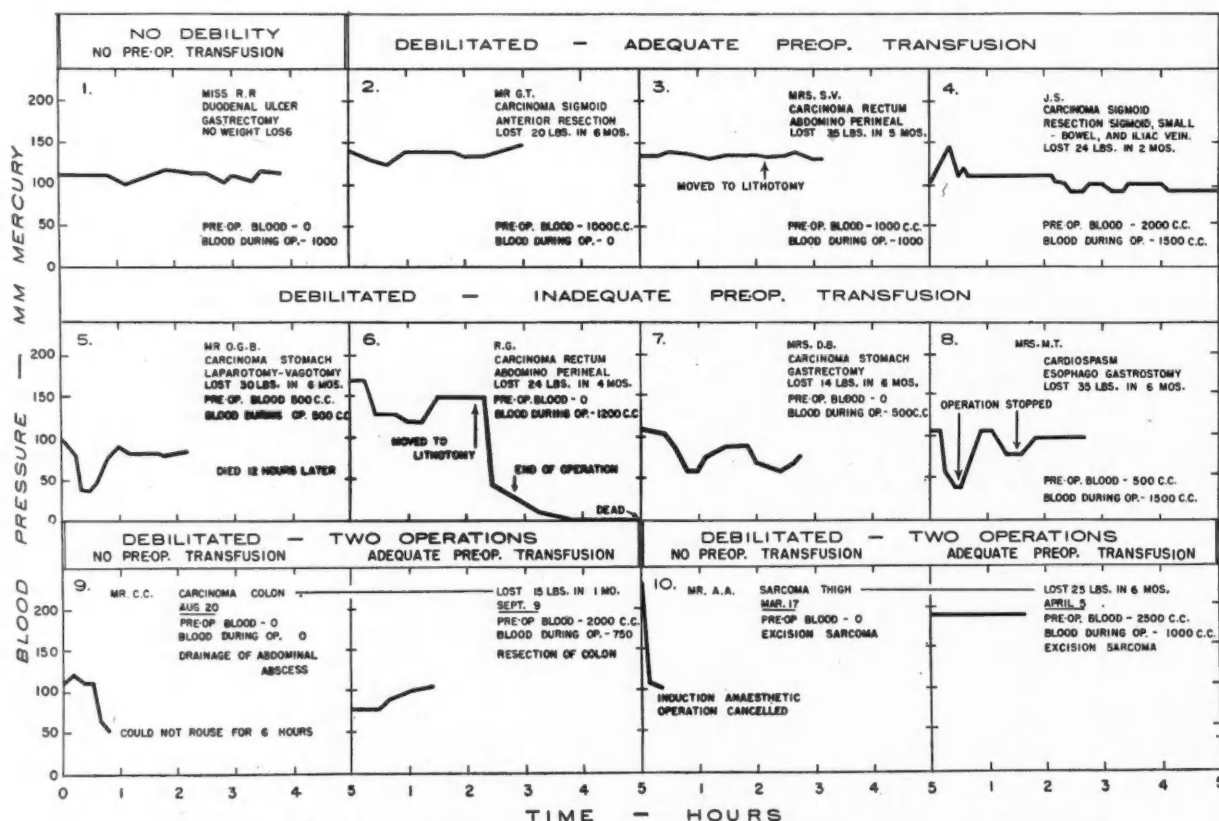


Fig. 2.—Operative blood pressure records in four groups of patients. They illustrate that the patients with no debility (1) require no preoperative transfusion; the debilitated patients with adequate preoperative blood transfusions (2, 3, 4) are usually protected against serious shock; and the debilitated patients without adequate preoperative transfusions (5, 6, 7, 8) are likely to experience a blood pressure fall which may be fatal. Two debilitated cases (9, 10) have been selected, each of whom had two operations. They further illustrate the importance of preoperative preparation with blood.

analysis. All the non-debilitated patients fell into the group that did not develop shock. Nine of the debilitated patients developed serious shock during the operation as indicated by an average lowest blood pressure of 62 mm. of mercury.

TABLE IV.

	No debility		Debilitated	
	B.P. steady during operation	B.P. steady during operation	B.P. fell during operation	B.P. fell during operation
Number of cases	16	16	9	
	mm.	mm.	mm.	
Average B.P. at start of operation	127	131	128	
Average highest B.P. during operation	138	141	131	
Average lowest B.P. during operation	119	116	62	
Average drop in B.P.	8	15	66	

These cases were then analyzed as shown in Table V in search of an explanation for their poor tolerance to surgery. Interestingly enough, in the debilitated group of patients there was very little difference in the clinical state between those who developed serious shock and those who did not. Actually the average debility was greater among those who tolerated the operation well.

TABLE V.

	No debility		Debilitated	
	B.P. steady during operation	B.P. steady during operation	B.P. fell during operation	B.P. fell during operation
Number of cases	16	16	9	
Average age	55.1 yrs.	57.5 yrs.	55.2 yrs.	
Average weight loss	0	27 lb. in 5.3 mos.	28 lb. in 6.0 mos.	
Average assessed debility	—	4	3	
Average hæmoglobin	96%	72%	70%	
Average total serum protein	—	5.8%	6.0%	
Average duration of anaesthesia	2.7 hrs.	2.5 hrs.	2.7 hrs.	

When the total amount of blood given preoperatively was determined, however, we found an explanation for the development of shock on the operating table by these 9 debilitated patients. As will be seen from Table VI, those with a serious blood pressure fall received an average of only 275 c.c. of blood before operation and 500 c.c. of blood was the largest amount any one in this group was given. Compared to this, the debilitated patients who

tolerated their operation well received an average of 1,400 c.c., varying from 1,000 c.c. to 2,500 c.c. preoperatively.

TABLE VI.

	No debility		Debilitated	
	B.P. steady during operation	B.P. steady during operation	B.P. fell during operation	B.P. fell during operation
Average amount of blood given prior to operation	0	1,400 c.c.	275 c.c.	
Average amount of blood given during operation	650 c.c.	750 c.c.	800 c.c.	

Since the average weight loss in the two debilitated groups of patients was 27 and 28 lb., (Table V) their calculated blood volume deficit was about the same. At 50 c.c. per pound weight loss both groups should have received the same amount of blood preoperatively (approximately 1,350 to 1,400 c.c.). The average of 1,400 c.c. was adequate replacement therapy for the first group and did appear to protect all of them from a blood pressure fall during and immediately after operation.

Finally, of the 41 cases studied, there were two deaths. Both of these occurred in the debilitated group that did not receive preoperative blood, representing a mortality of two in nine or 22%. These deaths occurred two and twelve hours postoperatively.

ILLUSTRATIVE CASES

A series of anæsthetic records have been reproduced in Fig. 2, to illustrate the above findings.

Case 1 illustrates a gastrectomy upon a non-debilitated duodenal ulcer patient with a blood pressure record typical of the 16 patients in this group.

Cases 2, 3 and 4 show typical operative records of debilitated patients who had adequate preoperative blood transfusions. They all show well sustained blood pressures throughout. Graph 4 is the record of a 60 year old male with a huge mass, the size of a grapefruit, excision of which required resection of the abdominal wall.

Cases 5, 6, 7 and 8 represent debilitated patients with weight loss and inadequate preoperative preparation with blood. Two cases received 500 c.c. of blood preoperatively and two cases had none.

Case 5 appeared unwell postoperatively, although fully conscious, with sustained blood pressure. About 10 hours postoperatively his condition rapidly deteriorated. Cause of death was presumed to be coronary thrombosis. Autopsy was not obtained.

Case 6 experienced sudden fall in blood pressure while being shifted to the lithotomy position and did not recover. This should be compared with Case 3. The problem of peripheral vascular collapse during the change in position with an abdominoperineal resection has been a worry in the past. It would appear to be due to a sudden loss of the vaso-constrictor mechanism which has been maintaining the blood pressure in the presence of reduced blood volume.

Case 7 represents an average blood pressure record in this group.

Case 8 was a thoracoabdominal exposure. She required rapid infusion of blood on two occasions to restore a safe blood pressure.

Cases 9 and 10 represent debilitated patients, each of whom had two operative procedures within a short period. In each case the first operation was carried out without preoperative transfusions, whereas the second operation followed preparation with 2,000 c.c. of blood.

Case 9 was a severely debilitated patient with a perforation of a carcinoma of the splenic flexure of colon following caecostomy. Simple drainage of the abscess caused this resulting shock state. Nineteen days later, after 2,000 c.c. of blood preoperatively, with the extensive abdominal abscess inadequately drained and his general condition worse if anything, Mickulitz resection of the colon was carried out in the abscess area. His blood pressure was well sustained and the postoperative course was satisfactory.

Case 10 was a male, age 75, appearing very emaciated, with a large fibrosarcoma involving the upper third of the lateral thigh. The first operation was cancelled when it was found that induction of anaesthetic had caused a serious fall in blood pressure. The second operation was a wide dissection of his thigh, which he withstood well after preoperative transfusions.

SUMMARY (PART II.)

In a study of 41 major operations, those patients *without* debility or weight loss showed a steady blood pressure record during the operation. None of them received blood transfusions preoperatively.

The debilitated patients with marked weight loss, whose blood volume deficit had been replaced by preoperative blood transfusions, showed equally satisfactory blood pressure records with no significant fall during the operation.

Another group of patients, with similar debility, weight loss and age, all suffered a serious fall in blood pressure during the operation. Their average preoperative preparation with blood was 250 c.c. and none received more than 500 c.c. This was far below their calculated blood volume deficit. Two out of this group of nine died in the immediate postoperative period.

DISCUSSION

This report has been written in a manner which it is hoped will be most useful to the practising surgeon. For the sake of clarity, total blood volume only has been recorded with no attempt to reduce this discussion to its components of red cell mass and plasma volume.

The summary of Part I agrees with the studies of Clark³ and others, although we have seen no reference to direct relationship between blood volume deficit and weight loss. The figure obtained graphically of 50 c.c. deficit per pound of weight loss can serve only as a rough guide. It is obvious that intestinal obstruction and de-

hydration, as well as previous obesity or extreme thinness will alter this relationship. The authors feel, however, that with an appreciation of this, weight loss should serve as a much better guide than the usual laboratory blood tests in assessing a patient's tolerance to major surgery.

In normal, healthy individuals the red blood cells in the circulation are discrete and their phagocytosis by the reticulo-endothelial cells proceeds as a normal physiological process. An experimental study of the phenomenon of intravascular agglutination of erythrocytes (sludging), carried out in this centre,⁸ has provided evidence that there is an increased rate of destruction of red cells by the liver phagocytes whenever they become agglutinated.

Since intravascular agglutination is present in the disease state under study, it is reasonable to infer that there is an increased rate of destruction of circulating red blood cells by the liver. This would account for the reduced red cell mass which is part of the picture of reduced blood volume. In a recent report¹⁰ it is suggested that the anaemia found with infections and malignancy is one of red cell destruction associated with a hyperplastic bone marrow. This may be evidence to support our concept.

These agglutinated red cells act as emboli and block many of the capillaries throughout the vascular bed. The resulting stasis is associated with a transudation of fluid elements of the blood into the surrounding tissues which in part at least may account for the reduction in plasma volume and changes found in interstitial fluid.

The dusky pallor which one finds in very debilitated patients is likely due to the generalized constriction of the peripheral vascular bed which is compensating for the reduced blood volume. This is perhaps augmented by cessation of capillary flow from embolic blockage by red cell clumps. It is a well known clinical guide to debility and would appear to have a theoretical basis in fact.

In considering the summary of Part II, one is impressed with the value of replacing the blood volume deficit before operation. It should be done in the 2 or 3 days prior to surgery in order to ensure maximum retention in the vascular bed of the transfused blood. We have found that 1,000 c.c. of whole blood a day does not appear to have a deleterious effect upon these old debilitated patients.

Apparently these patients with a blood volume deficit are able to ambulate with a normal pulse and blood pressure by virtue of a generalized constriction of the vascular tree. Induction of anaesthesia alone may paralyze this protective mechanism and the patient is immediately in possession of a vascular bed which he cannot fill. Thus he passes into a state of true (oligæmic) shock. The patient undergoing operation, with an untreated blood volume deficit of 2,000 c.c., who loses a further 500 c.c. is in an almost similar state to a normal, healthy person who has lost 2,500 c.c.

One question automatically arises out of this work: "Is it always necessary to replace completely the assessed blood volume deficit before surgery in the poor risk patient?" One has in mind conditions in which it is difficult to obtain blood or a malignant tumour which will probably prove inoperable and merely entail opening and closing the abdomen or chest. Our experience would indicate that one should prepare the patient with blood amounting to at least half of the assessed deficit and the closer one can come to full replacement, the safer the procedure will be.

In the case of a suspected inoperable malignancy with adequate blood available, one may plan to transfuse the patient with half the deficit volume preoperatively but have on hand blood sufficient to complete the deficit replacement, as well as to replace the expected blood loss during the operation. If the tumour is operable, then this total amount of blood should be infused at a suitable rate.

CONCEPT AND MANAGEMENT OF LOW BACKACHE

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BACKACHE is apparently a problem that we cannot escape and must make the best of, as the final answer has not been written. The literature is extensive and helpful, but there is one aspect of the problem that has not received the attention it deserves. The purpose of this paper is to emphasize one concept of the etiology of chronic and recurrent low back pain, and to outline a method of treatment that has had very gratifying results in a large series of cases. In 200 consecutive cases this type of backache constituted 47%.

CONCLUSIONS

1. Debilitated poor risk surgical patients suffering from a chronic disease appear to develop a serious reduction in blood volume related in degree to their weight loss.

2. Replacing the blood volume deficit by blood transfusions prior to major surgery protects these patients from surgical shock.

3. The amount of whole blood required to restore the blood volume to normal may be roughly assessed at 50 c.c. per pound of weight lost.

4. Recent weight loss appears to be a better index of debility and susceptibility to shock than any other clinical test.

5. The loss of blood volume may be explained in part by the phenomenon of intravascular agglutination of erythrocytes and an associated increased red blood cell destruction by the liver.

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In the investigation of backache the cause is often found to be in arthritis, either traumatic or true spondylitis. Or it may be spondylo-listhesis; or a protruded intervertebral disk. Less often it is a protruding fat pad, or a tumour. Rarely, the pain arises from a sacro-iliac subluxation.

When these conditions are ruled out there still remains the largest percentage of cases and in these there is no readily demonstrable lesion. Often these are described as "idiopathic"—a term which merely serves to hide the confusion. Because there may be minimal, and indeed often no findings, following injury, the people with these backs are said to be suffering from "compensationitis", and in the army they were sometimes thought to be an attempt at "getting

out". No doubt such conditions do and did exist, but in many cases there is a definite organic basis for the pain, despite the absence of findings. That the pain is real is indicated by the fact that the patient is often quite willing to undergo spinal fusion, or he pays for frequent trips to the chiropractor; also, it is relieved by treatment and the patient will keep up the treatment despite the nuisance.

The concept to be presented is based on the fact that every joint has an optimum position of function and that moderate departures from that position will increase the likelihood of strain and extreme departures will almost inevitably result in pain.

Since the low back bears at least one-half the body weight and was not constructed with the upright position in view, its joints are those in the body most likely to suffer strain. The majority of backaches are centred in the lumbo-sacral region and a review of the architecture at the junction between lumbar spine and pelvis will help to clarify the mechanism of the production of pain (Figs. 1 and 2).

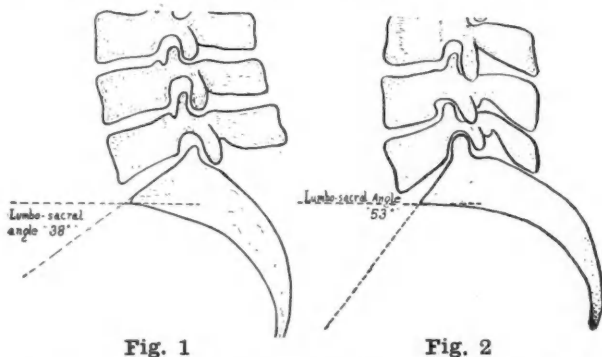


Fig. 1.—Normal lumbo-sacral region (diagrammatic).
Fig. 2.—Hyperextension.

It is to be noted that the lumbo-sacral joint constitutes the union between a fixed and a movable part of the anatomy. As well, the whole of the body weight above this point is thrown on this joint.

The first potentiality for backache lies in the angle the superior surface of the sacrum makes with the horizontal. Obviously on a mechanical basis, the closer this weight-bearing surface is to the horizontal, the better it is fitted to carry the body weight. However, the anatomy of the region qualifies this to a large extent and it is commonly said that if this angle is 45° or less a satisfactory mechanical situation exists. By and large, this is a suitable figure, but more important is the relationship between the anatomy of the contiguous structures.

Of equal importance is the angle between the lumbar spine and the pelvis. If this angle is increased so that the minor articulations are in a position which is beyond the range of normal function, a condition of strain exists, an inflammatory reaction is set up in the supporting ligaments of these structures, and pain results.

By far the most common type of backache due to this cause is the lordotic backache, or hyperextension strain, but it can also occur in flat back and in scoliosis.

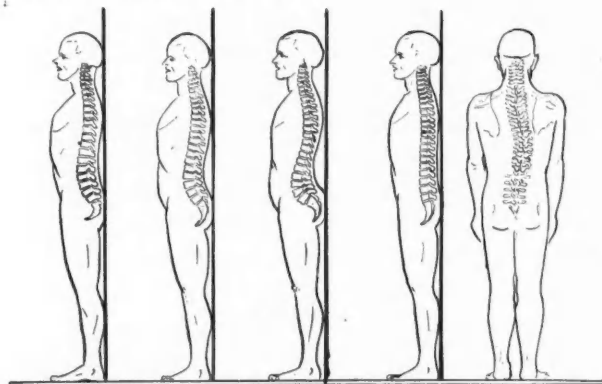


Fig. 3.—Left to right: (1) good posture; (2) moderate hyperextension; (3) marked hyperextension; (4) flat back; (5) scoliosis.

A high percentage of people have postural faults and may have no backache or only occasional episodes. Why do some develop backache? About twenty-five years ago Dr. Roger Lee went into this problem and to describe it borrowed a term from the cardiologists—decompensation. He felt that the poor posture, throwing an excessive strain on the muscles, resulted in pain. However, I think it more likely that the origin of the pain is ligamentous.

In people with poor posture the joints are at or near the limit of normal motion, but are prevented from going beyond this point by muscle power and there is no strain—the fault is compensated. As with the heart, if something breaks that compensation the joints will be moved beyond the limits of normal and strain or decompensation results. Clinically this is backache.

What are these factors—these last straws that will nearly break the human back? (1) Trauma—acute or chronic. (2) Acute illness. (3) Psychic factors. (4) Pregnancy. (5) Chilling. (6) Fatigue. (7) Foci of infection. (8) General ill health. (9) Faulty feet. (10) Obesity.

These factors are not cut-and-dried. They may overlap and more than one may be in-

volved. Some of them require a little explanation. Trauma may be merely an unusual lift, a sudden turn or a wrench when caught off guard. Sitting in a cramped position, or a long auto ride could be enough. In farmers, it may be riding a tractor or other rough machine.

Any illness which is sufficient to result in lowered muscle function may bring about decompensation in a susceptible individual. Psychic depression is usually accompanied by lowered muscular tone and can thus bring on backache.

As with the heart, so in the low back, there may be congenital defects, but since nature appears less satisfied with her efforts at the lumbo-sacral junction than with the heart, the number of anomalies in the spine is much greater. These do not require to be detailed. Sufficient to remember that they do exist and the majority of them lessen the stability of the back and predispose to strain. They are a threat to compensation.

Diagnosis.—As in all branches of medicine, in backache an accurate diagnosis is essential to successful treatment. The first step is to determine that the ache arises in the back and is not referred from kidney, bowel, pelvis, or other nearby structures.

If pain is aggravated by movement of a joint, becomes more severe on continued use of that joint, and is relieved by putting that joint completely at rest, then the pain likely arises in that joint or in the structures related to the joint. This does not mean to say that if a patient wakes with a backache, that pain is not due to postural decompensation; many backs are not given a rest during the night. Indeed, in many cases, all that is required is insurance that the back does get a daily rest.

To my knowledge, there is no other way of arriving at a diagnosis than by means of a painstaking history and careful physical examination. There is little comfort in treating backache as being of muscular origin and then finding out that it arose from a chronic pelvic condition. The history and physical examination will usually reveal this disease, although postural backache may co-exist with pelvic inflammation, the latter acting as the decompensating factor.

There is no typical history in backache due to decompensation although certain common factors are noted. In most, the history is of

years of pain, with or without periods of freedom. As would be expected, this pain centres about the lumbo-sacral junction and may be in the mid-line or on either side. It becomes worse as the day goes on. It is aggravated by activity that makes use of the back, such as washing and cleaning floors. It is often bad first thing in the morning and loosens up for the first few hours of the day. This appears to depend upon the type of bed the patient uses and on the severity of the condition. In a severe decompensation, the inflammatory reaction has not time to subside during the night and results in stiffness and soreness which can be partially worked off by activity. Many patients say that they obtain relief from lying down after lunch. Others find a corset very comforting.

Frequently the pain extends around to the hypogastrium, or it may be referred into the buttocks or down either thigh, rarely as far as the knee, and it does not have the definite geographical distribution of the pain caused by pressure on the sciatic nerve roots as in protruded disk.

Physical examination.—The technique for routine examination of the back can be found in any standard text. The important point is that examination may be entirely negative except for static abnormalities. There may be no muscle spasm, and no complaint of pain on movement at the time of examination, especially so if the patient has taken the day off to visit the doctor and the back has had some rest. However, there will likely be pain on the extremes of movement, and tenderness and muscle spasm are common.

The most important observation is that of the patient standing in his natural attitude. Then, an excessive lordosis, scoliosis, or flat back is usually apparent. However, even the practised eye may not detect a postural fault, but if the patient is asked to back up against a wall and requested to stand with heels, buttocks, shoulders and occiput against the wall and try to squeeze the examiner's hand with the small of the back, the fault immediately becomes apparent. At the same time the abdominal muscles can be tested for power. In the case of scoliosis, a plum-bob will show the deviations from the mid line.

If the back is aching at the time of examination a useful therapeutic test can be tried. The patient is asked to lie on the examining table

with the knees raised the height of two or three pillows. The examiner's hand is placed under the lumbar area to take the weight. The patient will often immediately express some relief from pain.

Next, examination of the feet is carried out. *Pes valgoplanus*—which is decompensation of the feet—often is the cause of altered mechanics at the lumbo-sacral junction, resulting in hyperextension. If occurring in only one foot, it may cause unilateral back pain. A short heel cord may cause flat back, or hyperflexion.

Certain laboratory procedures must be carried out as well as physical examination. Blood taken for Wassermann reaction, haemoglobin and sedimentation rate may point to factors active in the etiology of the backache. The urine should be tested, including microscopic examination.

X-ray examination of the lumbo-sacral spine should be carried out. Films taken in the erect position will serve to show the mechanics of the back in weight-bearing, but they are not necessary. Routine radiographs will demonstrate congenital anomalies which predispose to strain; they will show areas of sclerosis and lipping which point up the areas of excessive wear-and-tear; sometimes old fractures are brought to light. Arthritis and tumour, unless very early, can be ruled out. Oblique views often show up disease that is not apparent in antero-posterior and lateral.

A measurement of the angle the superior surface of the sacrum makes with the horizontal, and the angle at the sacrum and the lumbar spine will indicate the gross mechanical factors at work. A more detailed concept of the situation can be obtained by a study of the relationship between the following structures (Fig. 2):

1. The vertebral bodies. Parallelism is the normal. Excessive lack of it will result in strain.
2. The minor articular processes. In lordosis there is excessive over-riding; in flat back they tend to be drawn away from one another.
3. The intervertebral foramina. In lordosis, these are smaller and dumb-bell-shaped. In flat back they are increased in size.
4. The spinous processes. In marked lordosis there will be impingement which will eventually lead to sclerosis at the pressure points.

It must be borne in mind that the x-ray changes in the bone in static disturbances are months or even years behind the soft tissue changes. Years of strain may take place before the soft tissue irritation results in calcification

which we recognize as lipping, and even this will not be painful unless there is decompensation. Again, excessive pressure will take a long time to express itself as eburnation or sclerosis. As well, there may be pain long before this is seen, and conversely, there is often sclerosis without pain. This appears to depend on soft tissue reaction.

A consultation between the radiologist and the physician, with this concept of backache in mind, will be invaluable in arriving at a conclusion.

TREATMENT

1. Flat back. In my experience, this is a rare condition and any I have seen have been relieved by raising the heels. Presumably there are more severe cases which might require readjustment of the mechanics to establish a lordosis sufficient to take the tension off the supporting ligaments.

2. Excessive lordosis or hyperextension strain. This group contains the great majority of sufferers from chronic backache.

Treatment is directed towards the two factors: (a) The decompensating factor must be corrected. This is a problem in general therapeutics. (b) The backache must be treated.

The first step in treatment of the backache is to give the patient an understanding of his problem, to explain to him in the simplest terms possible the disturbance in mechanics that is the cause of his pain. For illustration and explanation I have found that to use the wrist as an example is most productive of insight.

A typical explanation will run something like this: "Here is the normal position of the wrist" (Fig. 4a). "Here is the normal limit of bending." (With the hand acutely flexed on the wrist) Fig. 4b. "This does not hurt. I can even use pressure on the hand to try to push it further, but as long as the muscles in the arm can stand up to the pressure, there is no pain. However, once the weight is too great, or if the muscles are caught off guard, or if for any reason those muscles cannot stand up to the pressure, the hand goes a little further, strain is put on the supporting structures and there is pain. In your case the factor is . . ."

Following this, if a skeleton is available, more enlightenment can be given. If an attempt to flatten the back against the wall, or support under the lumbar area in the lying position

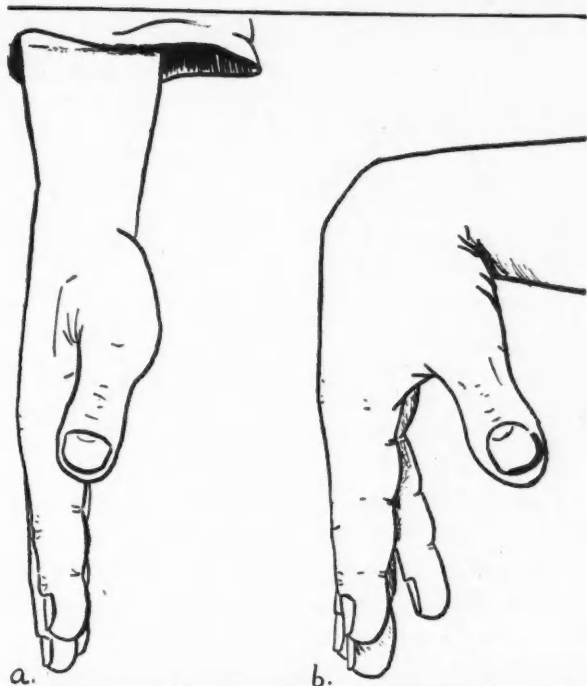


Fig. 4.—(a) Neutral position of wrist joint.
(b) Extreme of normal motion.

gave relief, the argument is clinched. If the patient accepts the explanation, he is more than half way on the road to recovery from backache.

If the pain is severe, nothing will replace bed rest. Rest is only obtained on a firm bed, with the knees elevated and support of the proper thickness under the lumbar curve. Heat, counter-irritation, and analgesics sufficient to relieve the pain complete the routine. An anti-spasmodic such as tolserol is often valuable.

In less severe cases treatment may be ambulatory, using periods of heat, massage, counter-irritation and analgesics as required. The services of a competent physiotherapist in relieving the acute reaction are valuable, if available, or if the patient can afford them. Usually the relief is more rapid but that is all.

In some cases strapping will give relief. Occasionally, in the case of very poor posture with poor musculature, a corset is prescribed until the muscles are built up. Some men who do hard work and have congenital defects that cannot be overcome are required to wear some form of support whenever they do heavy work. Older people, who have permanent changes, often have to do the same.

Much is claimed for the injection of local anaesthetics in low back pain. When there is a localized area of tenderness, and especially if there is a palpable nodule, and if it fulfills the dictate of Leriche, I have found it to be of

value. However, these cases are few and much more is achieved by the use of the measures of physiotherapy.

The milder cases will respond to corrective measures.

Corrective treatment.—All individuals with backache should sleep on a firm bed. This is made by putting slats or plywood under an ordinary mattress. Many mild cases are cured by this measure. I recall one woman who a few years ago went on a camping trip against orders; she had to sleep on the ground and underwent a remarkable recovery from a backache that had plagued her for years.

The second corrective measure is exercise; exercise designed to correct the underlying mechanical fault. If feasible, the patient is sent to a physiotherapist who instructs him and supervises in the early phases. If not feasible, the exercises are demonstrated to the patient and he is given a printed list of instructions. He is told not to rush at it, as the faults of many years will not be corrected in a few days. Hurrying the process merely results in stiffness and soreness, which in turn results in discouragement. To see the patient at intervals of one to two weeks to bolster his morale will prevent many failures.

One woman who had experienced relief for a year wrote in to say that the backache had recurred and that the exercises no longer relieved. Examination showed that she had forgotten how to do them and was not correcting the hyperextension. Further instruction brought quick relief.

There are many systems of exercise; any designed to promote proper posture are suitable. Such are described in the Bulletin of the Children's Bureau of the United States Department of Labour, publication No. 1650. These are reprinted in Hyman's *An Integrated Practice of Medicine. Body Mechanics* by Kuhn Goldthwait *et al.* has a similar set. The best exercise is normal use of the part and the patient must throughout the day pay attention to his carriage and endeavour to achieve proper posture. It is entirely a question of mind over matter and the patient is master of his own fate.

For those who say that they get enough exercise all day long in their work, the only answer I know is that practice makes perfect, but not if you practise the wrong way. If this, plus explanation, does not convince them, and

I am sure of my ground, all I can say is that I may be able to do something to relieve their acute attack, but can give no assurance for the future and maybe they should seek help elsewhere.

"Elsewhere" is often the chiropractor. Very often he gives immediate relief of the attack. An explanation of this is that in many cases there are peri-articular adhesions and these are broken down by manipulation. Adhesions or no, manipulation brings the joints into better alignment and relief from pain is experienced. However, the basic cause is still operating and the pain will recur when decompensating factors again appear. Nevertheless, manipulation is part of the therapeutic armamentarium of the regular practitioner and should be used where there is either localized or generalized rigidity arising from these causes. A supple back is generally a comfortable back.

Scoliosis.—Here the same principles apply. Many cases of postural scoliosis have no pain. Attacks are often relieved by manipulation. Some authorities say they have never seen an idiopathic scoliosis corrected by exercise. That has not been my experience in early cases. The exercises are the same—those designed to produce symmetrical development—and, again, the patient must think of his posture all through the day.

More advanced cases have been kept free of pain and the condition has not progressed. Here, again, it seems reasonable to assume that the pain is due to irritation of the supporting structures due to the joint exceeding the range of normal motion.

Mention should be made of protrusion of the intervertebral disk. We know that more than 95% of cases of protruded disk will respond to conservative treatment. Those that respond best are those in whom the back is lordotic and when this condition is corrected, the chances of recurrence are much lessened. If protrusion of the disk occurs in a flat back the chances of requiring surgery are much increased.

The same argument applies to spondylolisthesis. Often this is an accidental finding which has never given rise to symptoms. Usually these cases show the superior surface of the sacrum approaching the horizontal plane. Many cases of first or second degree spondylolisthesis which show a large lumbo-sacral angle can be rendered symptom-free by correction of the mechanics and application of a corset.

Prophylaxis.—The prevention of this type of backache lies in the observance of the principles of good body mechanics. Training should start in childhood. Children should be instructed to stand tall and sit tall. School desks should fit the child. Physical training instructors should be instructed in the principles of good posture. During the war many low backs at basic training centres were thrown into a state of decompensation by the insistence of the sergeant-majors on the adoption of the efflaggerated military attitude. With the chief attention applied to the shoulders the lumbar spine will likely be forced into hyperextension. An explanation of the origin of this pain relieved the majority of backaches.

Pregnant women, or better still, women about to become pregnant, should be instructed in proper posture and should build up their muscles for the strain that is about to be placed upon them. Then, unless there are other factors, a support will not likely be needed. Too, in the post-partum period, as the baby gets heavier the back tends to give out. Forewarning will prevent this.

Many occupation groups show a tendency to backache. Fortunately this has been recognized and instruction in proper posture is routine at most training schools, such as business colleges.

An individual with a known tendency to backache should be x-rayed to determine if there are any congenital weaknesses that predispose to strain. Industry has found that this measure pays dividends. These men are not put on heavy jobs. If the man is on his own, often he will require a corset to bolster this congenitally weak back. Instruction in how to lift will bring surprising results. Lifting with strong legs instead of a weak back has cured many low backaches.

CONCLUSIONS

Backache is a symptom. In the majority of cases it is the manifestation of some disturbance in the back itself, together with some factor affecting the individual as a whole. If the problem of backache is approached with this double causation in mind, the results of treatment can be very happy.

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CASE REPORTS

SPOROTRICHOSIS

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In 1898 Schenck¹ from Baltimore described the first case of sporotrichosis and classified the fungus in the genus *Sporotrichum*. In 1900, Hektoen and Perkins² reported the second case, confirmed Schenck's findings and named the organism *Sporothrix Schenckii*. In their studies they could not find any cultural or morphological difference between the fungus Schenck isolated and their isolation, and evidently believed the names sporotrichum and sporothrix to be synonymous. They recognized Schenck's work by establishing the species *Schenckii*. In 1903 de Beurman in France studied this infection and believed the etiological agent of the French infections to differ morphologically and culturally from *S. Schenckii*. Matruchot and Ramond in 1905 named de Beurman's fungus *Sporotrichum Beurmani*. It is now believed that these fungi are the same species.

As far as we have been able to learn, the case we present here is the first one reported in Canada in which laboratory tests establish the etiology to be *Sporotrichum Schenckii*. In 1915, Learmonth³ in Alberta reported having seen two cases and described one of these. He concluded from the laboratory findings that the fungus he isolated differed from both the Schenck and de Beurman types. An attempt to establish its pathogenicity with mice failed, and in the cultural examination he found "large, ovoid, almost cigar-shaped" forms. We have never been able to find this type of cell produced in the filamentous culture by *S. Schenckii*. It seems strange that for thirty-five years there have been no reports of this infection in Canada, especially since so many citizens are doing some form of agricultural work usually associated with this infection. Is it because there are not laboratories interested in doing mycological studies or is the infection not recognized by clinicians?

Habitat.—*Sporotrichum Schenckii* has been isolated from plant tissue, especially sphagnum moss, timber, etc., and many primary infections

have been traced to injuries by thorns, particularly of the barberry bush.⁴ It has been isolated from sphagnum moss at the laboratories of the National Institute of Health, Bethesda.⁵ This moss was believed responsible for infecting a number of florists. *Sporotrichum Schenckii* was isolated from mine timber during the epidemic of sporotrichosis at the Witwatersrand gold fields in South Africa.⁶ This epidemic lasted from 1941 to 1944 and 2,441 cases were diagnosed. Benham and Kesten⁷ succeeded in demonstrating the ability of this fungus to grow in plant tissue by inoculating carnation buds. The fungus has the ability to infect many of the lower animals such as the horse, dog, etc.⁸

Clinical.—Sporotrichosis is a subacute or chronic fungus infection. Most cases reported on this continent are of a localized lymphangitic type, occurring chiefly on an extremity. *S. Schenckii* may cause also a generalized infection attacking a great variety of tissues. With the localized lymphangitic type, infection usually occurs at a site of trauma caused by some sharp object such as a thorn. It is believed also that the organism may enter through the alimentary tract, since rats have been infected by feeding them the organism. The primary lesion of a localized lymphangitic infection may be a pustule, small abscess, ulcer or may closely resemble a gumma or chancre. Following the appearance of the primary lesion the infection spreads along the regional lymphatics, forming hard, reddened lumps that, at first, may be mistaken for boils. However, they differ from boils in being cold and not markedly tender. If the infection is not treated, these lesions break down like the primary lesion and discharge some purulent material. The course of this infection is indicated by the thickening of the lymph vessels and reddened streaks. The infection usually stops at the regional lymph node, but may be spread by contact to another area.

The other forms of this infection include disseminated sporotrichosis with the formation of subcutaneous gumma-like lesions, subcutaneous ulcerative gumma-like lesions and extracutaneous lesions where the fungus infects mucous membranes, muscles, glands and bones. Infection of these tissues is usually associated with a cutaneous or subcutaneous infection. The subcutaneous infection is characterized by the formation of hard, painless nodules which develop into cold abscesses. The lesions of the

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ulcerative form have a tendency to early spontaneous ulceration and may be mistaken for tertiary syphilitic lesions. The nodules in the non-ulcerative type do not rupture spontaneously, but if incised develop into syphiloid lesions.

Diagnosis.—*Sporotrichum Schenckii*, like most of the other pathogenic fungi that cause a systemic or subcutaneous infection, appears in the infected tissue in a very different form from its appearance when grown at room temperature on a dextrose agar medium. In purulent material collected from a sporotrichotic lesion the fungus appears as a cigar-shaped organism. It is very difficult to find, but if some of the infectious discharge is injected into the peritoneal cavity of male white mice or rats the organism will be found in great numbers at autopsy.

Cultural study of the fungus is very important. Purulent material from a lesion should be streaked on Sabouraud agar and Littman agar. The latter medium contains oxgall, crystal violet and streptomycin to inhibit the growth of bacteria and to restrict the spreading of fungus colonies. This is an excellent medium and frequently enables one to isolate a pathogenic fungus from contaminated material. On Sabouraud agar *S. Schenckii* appears as soft, moist, shiny colonies whitish in colour and looking not unlike colonies of yeast. The colony gradually becomes firmer, fine furrows cover the surface which becomes membranous in appearance. The colour varies from light tan to black. A microscopic examination of this growth reveals a tangled mass of fine, branched septate mycelium and large numbers of pear-shaped to round conidia along the sides of the filaments or in groups at the ends of lateral branches. It is believed that the spores are responsible for the colour of the colony. This colour varies a great deal either on the same medium or when transferred to a different one. To verify the cultural growth it is advisable to inoculate male white mice or rats as previously described. An inflamed, very much swollen scrotal sac indicates the pathogenicity of the organism, which will be found present in great numbers in the peritoneum and the scrotal contents when the animal is autopsied.

On August 1, 1950 Mrs. L., a florist assistant, consulted one of us (W.V.M.) regarding a "pimple" on her wrist which had formed during the previous four days. She had squeezed a little pus out of it but had no

recollection of injuring or pricking her wrist at any time previously.

Examination revealed a healthy looking woman with a red, pea sized lesion on the front of her right wrist. It was noticeably red but not very tender. Some yellowish material could be seen coming out of it. There was a lymphangitis extending a few inches up the forearm and on palpation some hard lumps were noted under the skin along the lymphatics. At no time did the temperature or pulse rate rise significantly.

The patient was given sulfathiazole and later penicillin and told to soak the arm in hot saline several times a day. In spite of this, in five days, the nodular lymphangitis had spread close to the axilla. Dihydrostreptomycin was given in ½ gram doses for four days. Since the infection was not showing any marked improvement with this treatment it was suspected that it might be an infectious granuloma, so material was collected and sent to the laboratory of Grace Hospital, Windsor, to be cultured. Iodides were started August 16 and continued for eight weeks at 100 grains per day. During this time the shotty nodules disappeared but the primary area, although completely flat is still noticeably red after several months.

The patient was only off work a week and pain was not a feature of the infection.

The fungus grown from the material submitted to the Grace Hospital was sent to the Central Laboratory of the Ontario Department of Health in Toronto to be identified.

Cultural studies at this laboratory showed the fungus to be a species of *Sporotrichum*, very likely *Schenckii*, so male white mice were inoculated to determine its pathogenicity. In order to shorten the time required for animal tests, some mice were inoculated directly into the scrotal sac instead of the peritoneal cavity as is usually done. In ten days these mice died, the scrotal sac was very inflamed and swollen to at least half the size of the mouse's head. The cigar-shaped bodies or tissue phase of *S. Schenckii* were present in great numbers in Gram stained smears made from the testes and epididymides. Sabouraud's and Littman's agar were inoculated and pure cultures of *S. Schenckii* grown.

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CARCINOMA OF THE UVULA

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Malignant tumours of the soft palate are relatively common and usually arise from the free edge,¹ however those with their primary site of origin in the uvula are rare.^{2,3} The standard textbooks on disease of the nose and throat do little more than mention the fact that malignancy can affect the uvula. Because of its rarity the following case is reported.

Mr. A.B., aged 63, was first seen in January, 1950. In October, 1949, he had noticed a "heavy sensation" in the back of his throat which persisted. One month later he began to gag occasionally for no apparent reason. He was examined by a friend and told his uvula was swollen. There were no other complaints. On examination he was found to be edentulous, the mouth was clean, tonsils were moderately enlarged but not infected, the hard palate and soft palate were normal. The uvula was markedly enlarged. The lower two-thirds were nodular, irregular and covered with a whitish slough (Fig. 1). The mucosa of the remainder

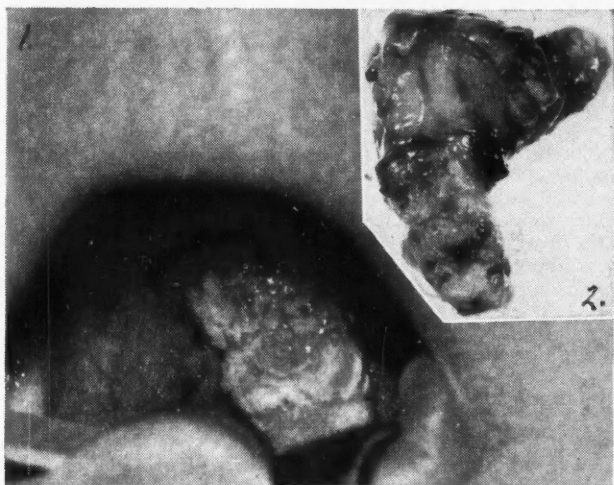


Fig. 1.—Preoperative appearance.

Fig. 2.—Specimen removed at operation (anterior view).

of the uvula was smooth and appeared healthy. There were no palpable glands in the neck. A specimen was taken for biopsy and the pathological diagnosis was squamous cell carcinoma.

Under general anaesthesia the entire uvula and the greater part of the soft palate were excised (Fig. 2). The larger bleeding points were controlled with ligatures and the cut edge of the palate cauterized with the electric cautery. There were no postoperative complications except for some transient difficulty in swallowing liquids.

The patient was given a series of deep x-ray treatments postoperatively, even though it was felt that the tumour had been completely removed. There has been no recurrence to date.

In discussing the treatment of carcinoma of the uvula Imperatori⁴ advised that the tonsils be removed as well as the uvula. This was not done in the treatment of this case. As noted above the patient has no disability, and had the tonsils been removed we feel that there would have been a much greater defect, requiring the use of some type of prosthesis.

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It is perhaps the highest distinction of the Greeks that they recognized the indissoluble connection of beauty and goodness.—Charles Eliot Norton.

PRIMARY BILATERAL TESTICULAR TUMOUR*

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The presence of primary bilateral testicular tumour is of sufficient rarity to warrant a report of such cases. This is particularly true if compared with the incidence of unilateral testicular growth. To illustrate the unusual incidence of primary bilateral testicular malignancy, by which we mean the occurrence of the tumours simultaneously having originated at essentially the same time, the report by Friedman and Moore,¹ from the Army Institute of Pathology, is of interest. Their study of 922 cases of malignancy of the testicle shows no instance of bilateral primary testicular tumour in the series. Gilbert and Hamilton² reviewed 7,000 cases of testicular tumour, and found an incidence of 2% which were primary bilateral. A summary of the world literature by Gill and Howell,³ in 1948, showed only 156 cases of primary bilateral testicular tumour. In fully half or more of the cases reported, the second malignancy had occurred anywhere from a few weeks to 13 years after the first. In addition, many of the cases cited have been in testicles located in the abdomen, inguinal region, or some other ectopic position. The case to be presented is of particular interest in that the testicular swellings were noted simultaneously and in normally placed gonads.

Hotchkiss and Laury⁴ reviewed 21 cases from the world literature of concomitant bilateral testicular cancer in scrotal testes. They noted three distinctive features in this series namely, a relatively large proportion of lymphoid tumours, a survival rate which was extremely low, and an average age incidence of 51 years, in contrast to 35 to 39 years for unilateral tumours.

The patient was a 68 year old merchant, who was admitted to the Jewish General Hospital, on July 27, 1949, with a history of bilateral painless scrotal swelling of one month's duration. He had noted a gradual increase in the size of both testes, with no antecedent history of trauma or infection. There were no urinary symptoms, and the functional enquiry was otherwise negative. He reported a gain in weight, of approximately 9 pounds, in the previous 2 months. Past history was negative

* Presented at the Montreal Clinical Society, January 25, 1950.

except for bronchitis and asthma of many years' duration. Physical examination revealed a well developed and nourished male, of stated age. The heart and lungs were clear. The abdomen was protuberant, and no masses were palpable. The kidneys were not palpable, and no bladder mass was present. On examination of the scrotum, both testes were uniformly enlarged to the size of a hen's egg, smooth, very firm and non-tender. They were freely movable, and the epididymes were small and poorly defined. The vasa were neither thickened nor nodular. The penis showed 2 small depressed scars on the glans. The prostate was slightly enlarged, smooth, glandular and non tender. Urinalysis was negative. The haemoglobin was 87%; red blood cells were 4 million and white blood cells 12,000. Chest x-ray showed mild emphysema and congestion in both hili. Friedman test of urine was negative. The non-protein nitrogen was 36 mgm. % per 100 c.c. blood. At operation, July 30, bilateral orchidectomy was performed, with the frozen section diagnosis of tumour, probably seminoma, (Dr. M. A. Simon).

In the gross examination, the left testis weighed 36 gm. and measured 5 x 3 x 4 cm., the right weighed 45 gm. and measured 7 x 5 x 3 cm. On section (Fig. 1),

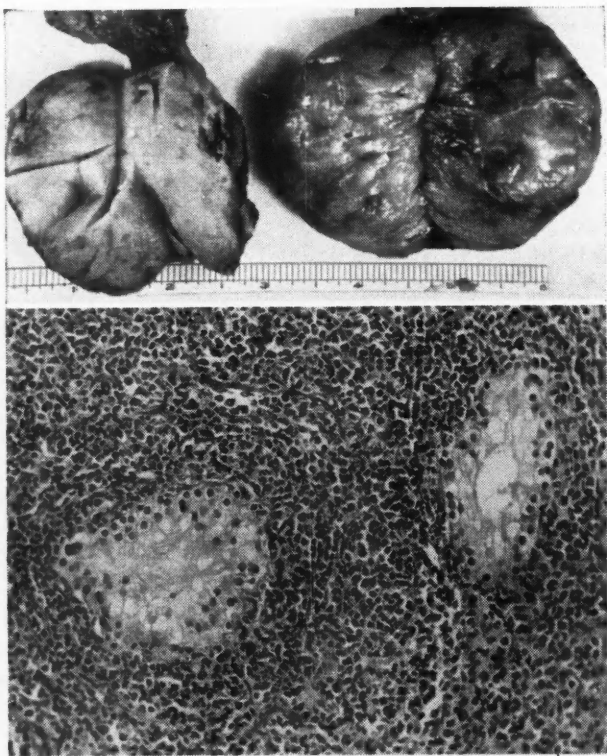


Fig. 1.—Sectioned testes showing homogeneous greyish white substance, with complete loss of tubular architecture. Fig. 2.—Seminiferous tubules surrounded by a diffuse mass of tumour cells, of uniform mononuclear type. The microscopic picture of seminoma was identical in both testes. (x220).

both testes showed homogeneous greyish-white substance of rubbery consistency, with complete loss of tubular architecture. The tunica albuginea was grey, smooth and glistening and showed no tumour tissue on its external surface. On microscopic examination (Fig. 2) there was complete alteration of the usual architecture due to a diffuse infiltration by tumour. The tumour consisted of a fairly uniform mononuclear type of cell, somewhat larger than a lymphocyte, and showing relatively dense nuclei. On both sides the periepididymal tissue, as well as the spermatic cord, were infiltrated by tumour. The diagnosis was seminoma, involving both testicles, with the following comment: "It is probable that these lesions represent bilateral primary seminomas of the

testes". On discharge from the hospital the patient received a course of deep x-ray therapy to the regional lymph nodes and chest, and was free of demonstrable metastases 6 months later.

Ten months after operation his family physician noted marked swelling of the left cervical glands which were hard, fixed, non tender, and an x-ray of the cervical region showed marked deviation of the trachea to the left, as a result of the compressing mass of glands. At about the same time he developed urinary symptoms of frequency, and difficulty in starting the stream, which culminated in acute urinary retention for which he was hospitalized. On examination, the patient showed signs of recent weight loss and generalized pallor. The mass of left cervical lymph nodes was quite prominent.

The abdomen was protuberant and a fluid wave elicited. A doughy mass was palpated in the subumbilical region which was interpreted as enlarged para-aortic lymph nodes. A chest x-ray showed no evidence of parenchymal involvement, and the trachea was markedly deviated to the right. A transurethral resection of the vesical neck was performed in order to promote micturition, and approximately 10 grams of tissue were removed, the prostate being of small size. The patient, however, was unable to void following removal of the catheter, and he returned home on intermittent catheterization. He continued a rapid downhill course and expired within two weeks. Unfortunately an autopsy could not be obtained.

Discussion.—To support the view that these are primary malignancies one must consider the mode of spread of testicular tumours along the regional nodes of the abdominal lymphatic chain and, in addition, the simultaneous occurrence of these tumours is further evidence in favour of this concept. In some of the cases reported different cell types have been noted in the malignant tumours on both sides.

The age incidence of bilateral primary testicular malignancy has been reported as ranging from an 8 month fetus, the youngest to 76 years, the oldest, in the cases published. It has been shown that there is a decided tendency for bilateral cases to occur later in life. Also the chorionepithelioma, a tumour which occurs in unilateral cases at the age of greatest sexual activity (rarely over 40), has not been known to occur bilaterally. The majority of bilateral tumours are unicellular, as in our case; however, occasionally different cell types have occurred in the same patient. The pathological types of bilateral tumours are similar to those occurring unilaterally.

Willis⁵ has drawn attention to the not infrequent occurrence of bilateral seminomas occurring in old dogs, which he states are clearly the counterparts of those in man. In his recorded cases it would appear that they affect undescended testes with disproportionate frequency. This concept of higher degree of potential malignancy in cryptorchids has undergone considerable change in recent years, according to extensive urological investigation,

and current opinion does not place a higher degree of potential malignancy on the undescended testis than on the normally placed gonad. This question, however, remains a source of contention among urologists.

SUMMARY

A case of primary bilateral testicular tumour has been presented. The cellular type was identical in both testes and had the histological appearance of seminoma. The rarity of this lesion is further enhanced, in view of the simultaneous appearance of the tumour, in normally placed gonads.

We wish to express our appreciation to Dr. M. A. Simon for his pathological studies in this case.

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SUBACUTE ENTEROCOCCAL ENDOCARDITIS*

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The chronic form of infectious endocarditis was emphasized in two classical papers by Osler and Horder, respectively. Since then the natural history of the disease has been well established. However, with one powerful antibiotic after another blossoming in the garden of chemotherapy, it becomes of great importance to delineate accurately the characteristics of the organism concerned, as directly upon these depend prognosis and treatment. Cure rates have advanced from 10% with oral sulfonamides to 60 to 70% with penicillin (Sirota, Gerber and Baehr), leaving a residue of some 25% of cases, many of which are enterococcal infections. With these latter, the problem arises of not only choosing the proper drug, but of introducing it into the body in sufficiently high concentration over a sufficiently long period of time.

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Sherman classifies streptococci into four main groups, in addition to their Lancefield grouping, as follows: (1) Pyogenic, (2) viridans, (3) lactic and (4) enterococci, including in the last group *Strep. zymogenes*, and labelling it as a Lancefield Group D hæmolytic streptococcus. He states "*Strep. zymogenes* is the most characteristic hæmolytic streptococcus of the normal human intestine," . . . "It is commonly, if not usually, the predominating hæmolytic form. It has little or no virulence for laboratory animals and in spite of its clinical history as an occasional invader of the human body," . . . "it is to be considered as non-pathogenic". *Micrococcus zymogenes* was the infecting organism in the first case of subacute enterococcal endocarditis reported in the literature, a patient of Sir William Osler's at the Johns Hopkins Hospital, described by MacCallum and Hastings in 1899. Sirota, Gerber and Baehr, in 1947, in a careful review of the literature were able to find only 65 reported cases since this original description. In a search of the literature since 1947, no additional cases have been encountered. The following two cases of subacute enterococcal endocarditis are therefore presented for their interest from the standpoint of infecting organisms, treatment and complications.

CASE 1

This 41 year old white female patient, a nurse, was admitted July 27, 1950, from another hospital, complaining of feverishness for 4 months, anorexia 4 months, and pain in the limbs for one month. In March, 1950, she felt tired, feverish and generally unwell, ascribing these symptoms to "the flu", although she had no cough or other signs of an upper respiratory tract infection. In spite of increased rest, her symptoms continued until mid-June, when she noted the sudden onset of steady aching pain in the left forearm, with increased pain on flexion of the fingers of the left hand. No swelling or redness was noted at this time. This symptom was followed in about a week by feverishness and night sweats. A few days later burning pain developed in the sole of the left foot and calf, accompanied by some swelling of these parts and with a small reddened area appearing on the plantar surface of the foot.

She was admitted to hospital July 4, exhibiting a low-grade, intermittent type of fever with frequent rise in temperature to 101 and 102°. Chest film, Paul Bunnell and agglutination tests for *S. typhi*, *S. paratyphi* A & B, *Br. abortus* and *P. tularensis* were reported as negative. Treatment consisted of general supportive measures, including administration of a fortified penicillin preparation in doses of 1 c.c. daily, streptomycin gm. ½ b.i.d. and aureomycin. Because of failure to respond to this treatment she was referred to Victoria Hospital for investigation on July 27.

On examination she appeared to be pale, but well-nourished and in no apparent distress. Abnormal physical signs were confined to the cardiovascular system. The heart was slightly enlarged to the left, with an early diastolic murmur. Temperature was 100.2° F. Duroziez' sign was positive. A diagnosis of rheumatic heart disease, with aortic regurgitation and complicated by subacute bacterial endocarditis, was made.

Fluoroscopy revealed an almost normal-appearing heart, with minimal left ventricular enlargement, normal pulmonary shadows and a normal aortic knob.

On August 1, a very small splinter hæmorrhage was seen on the fifth finger of the right hand. Urine on several occasions contained microscopic blood. Venous blood culture on seven of nine occasions grew *Strep. zymogenes*. E.S.R. on admission was 47 mm. per hour (Westergren); Hb. 62% (Dare); red blood count 3.6 million with a C.I. of 0.77; white blood count was 9,900 with a differential count of 82% neutrophils, 16% lymphocytes, 2% eosinophiles. Lumbar puncture was negative. Non-protein nitrogen was 19.6 mgm. %; stool negative for occult blood or parasites; chest film and electrocardiogram normal. Plasma proteins were 6.0 gm. with an A:G ratio of 1.6:1. Sensitivity tests done on the organism demonstrated complete resistance within therapeutic range to chloromycetin, marked sensitivity to terramycin, moderate sensitivity to aureomycin and streptomycin, and slight sensitivity only to penicillin.

On August 11, treatment was begun with oral terramycin hydrochloride, in a total daily dose of 5.0 gm.—5 (250 mgm.) capsules every six hours. In 48 hours the temperature was normal and remained so until the drug was discontinued seven days later because of severe nausea and vomiting, when evening elevations to 99 and 100° were again noted. Penicillin was then administered intramuscularly in doses of 2,000,000 units every 3 hours throughout the 24 hours—a total of 16,000,000 units daily—with no discernible effect on the temperature. With a second course of oral terramycin, from August 30 to September 3, in a total dosage of 3.0 gm. daily, a dramatic drop in temperature to normal occurred once more, but severe nausea and vomiting again necessitated its discontinuance. This experience with terramycin was very disappointing. In spite of its efficiency as an antibiotic in this particular case, its marked toxicity prevented the maintenance of therapeutic blood levels for any length of time.

In view of the sensitivity tests the penicillin dosage was increased to 20,000,000 units daily, and aureomycin orally in 3 gm. doses daily was begun but discontinued after only 4 days because of marked nausea and vomiting. Aureomycin prepared for intravenous use was administered intramuscularly in doses of 100 mgm. every 6 hours, each dose dissolved in 3 c.c. of 1% novocaine to reduce pain. This failed to control the infection and considerable aseptic muscle necrosis resulted from this therapy. On September 24 treatment was begun with intravenous aureomycin, employing 2,000 c.c. of 5% glucose in distilled water daily, containing 600 mgm. of aureomycin and 200 mgm. of heparin, administered through a plastic venous catheter. Penicillin, in a dosage of 20,000,000 units, was carried on with the intramuscular and intravenous aureomycin therapy until September 27 and then discontinued.

On October 14, the patient was noted to be severely depressed, upset and crying, and by the following day was definitely psychotic, with a peculiar mood change, abusive, sneering and completely unco-operative. Physical examination revealed a very small petechial hæmorrhage on the buccal membrane of the cheek, suggesting cerebral embolization as the cause of the patient's psychic upset. However, the mode of onset and type of mood change seems to favour more the expression of a latent personality defect. Treatment was carried on until October 21, then discontinued at which time a completely normal temperature had been continuously maintained for 10 days. By November 10, with a sustained normal temperature, it was decided to employ electro-shock therapy and two routine treatments were given on successive days, with the development on the next day of petechiæ in the cheek and under the finger nail of the left hand. Within a week a dramatic mental change was seen, with the patient reverting to her pre-psychotic personality.

Further complications before her discharge on December 9, included a mild bilateral thrombophlebitis, which subsided without incident, and the development of a firm nodule in each breast. On excision and pathological section both proved to be examples of chronic cystic mastitis. When discharged, December 9, the patient had

had a continuously normal temperature for fifty-two days, except for one day's fever during the episode of thrombophlebitis. The E.S.R. was 5 mm. per hour, Hb. 73% and red blood cells 4.9 million.

COMMENT

Although this patient was treated continuously from August 11, to October 21, a total of 72 days, with various antibiotics, only two seemed to have any real value—oral terramycin and intravenous aureomycin. Although the former drug produced a significant decrease in temperature, severe toxicity when given orally precluded its further use in this case. Intravenous aureomycin, administered continuously over a period of 26 days in this case would seem to have sterilized the blood stream and vegetations. Although following electro-shock therapy further evidences of embolization were seen, there is no reason for believing that these were septic, since they were associated with a normal temperature and pulse, a normal E.S.R. and a normal clinical state.

CASE 2

This patient, a 55 year old male, was referred to hospital January 10, 1950, with a diagnosis of subacute bacterial endocarditis. He gave a history of being perfectly well until 1½ years previously, when, following a tooth extraction, he stated that he "went all to pieces". He was admitted to another hospital in the fall of 1948 and discharged in early January, 1949. During this time his condition was diagnosed as subacute bacterial endocarditis and he was given penicillin followed by streptomycin.

Following this treatment he carried on his work for eight months but never felt as well as before. In mid-October, 1949, he noticed symptoms developing again. He was hospitalized for a thirty-day course of penicillin, administered every two hours, to which he partially but not completely responded. Resting at home two to three weeks before admission to Victoria Hospital he experienced chills on one occasion and observed that his temperature went up to 104° F.

On examination, the blood pressure was 112/76. The apex beat was in the fifth space one inch beyond the nipple line, with a systolic thrill and a systolic murmur heard best midway between the sternum and the apex. A diagnosis of subacute bacterial endocarditis was made. The underlying cardiac pathology was thought to be either ventricular septal defect or sub-aortic stenosis.

On admission he exhibited a regular daily intermittent fever up to 102 and 103° F. Chest x-ray showed moderate enlargement of the left ventricle. Electrocardiogram showed left axis deviation. E.S.R. was 52 mm. per hour; white blood count 7,000; urine negative. Repeated blood cultures grew *Strep. faecalis* and the organism was found to be insensitive to penicillin and chloromycetin, only mildly sensitive to streptomycin, and quite sensitive to aureomycin. Initial treatment consisted of half a gram of streptomycin administered intramuscularly every six hours. This was followed nine days later by aureomycin in half gram doses every six hours by mouth. Streptomycin was discontinued after four days of combined therapy. The patient received 45 days of such antibiotic therapy during which six blood cultures, taken at approximately weekly intervals, were negative. Aureomycin was discontinued March 3, and the patient remained afebrile and asymptomatic for 12 days with negative blood cultures. On March 15, E.S.R. was elevated to 33, a low grade fever occurred and he complained of low

back pain. Blood culture again showed the presence of an enterococcus similar to previous growth. On March 29 an antibiotic program of penicillin, 1,200,000 units daily, dihydrostreptomycin, 2 gm. daily, and aureomycin, 2 gm. daily, was begun. Dosage was increased on April 5 to 1,000,000 units of penicillin every 3 hours, aureomycin 3 gm. daily and streptomycin 2 gm. daily. In mid-June the patient developed paronychia around the nail of each great toe. This was treated conservatively at first, but in July the toenails were removed surgically.

The patient was discharged on September 8, 1950, by which time he had received penicillin, 1,224,000,000 units, streptomycin 318 gm. and aureomycin 504 gm. His last positive blood culture was April 1.

COMMENT

The large amounts of antibiotics used in this case over a period of eight months demonstrate the massive treatment which may be necessary in this type of infection. Here, combined streptomycin, aureomycin and penicillin, all in large doses, seem to have produced the desired effect. This patient has been clinically well since discharge, a period of four months.

DISCUSSION

The first case illustrates the problems involved with large doses of any antibiotic; orally, nausea and vomiting which prevent its absorption; intramuscularly, severe muscle necrosis, to frustrate the clinician; intravenously, thrombophlebitis, and gradual obliteration of the available supply of veins. The development in this patient of a psychosis (which in retrospect now would appear in its immediate response to discontinuance of therapy, rest and electro-shock treatment to have been in large part induced by the constant anxiety of a serious illness, plus the pain and sleeplessness that accompany any intensive "round the clock" program of antibiotic treatment) illustrates, in dramatic fashion, a paradox of clinical medicine in which treatment, necessary to save the patient's life, may produce serious illness itself.

The comparative rarity of reports of endocardial infections caused by *Strep. zymogenes*, an organism which (as has been mentioned above) is a common inhabitant of bowel seems puzzling unless it is remembered that many such infections have been considered in the past as examples of bacterial endocarditis due to *Strep. faecalis*. It is believed that Case 1 is the first case of *Strep. zymogenes* infection known to have been clinically arrested by the use of intravenous aureomycin.

SUMMARY

1. The 67th reported case of *Strep. zymogenes* endocarditis has been presented. It would ap-

pear to be the first case in which the course of the disease has been arrested clinically, in this patient by the use, finally, of intravenous aureomycin over a continuous period of 26 days. A second case is reported, arrested clinically after the combined use of penicillin, streptomycin, and aureomycin.

2. This experience with these 2 cases tends to demonstrate the clinical effectiveness of streptomycin, and, more especially, aureomycin in the treatment of subacute enterococcal endocarditis.

3. Such infections need long dosage of antibiotics in high concentrations, and must therefore be treated as efficiently and as quickly as possible to avoid complications which may render treatment ineffective or impossible.

We acknowledge gratefully the encouragement and direction given us in the study of these patients by Professor F. S. Brien and Professor G. W. Manning, on whose services these patients were studied, and also thank Professor R. G. Murray for his careful bacteriological studies.

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SYSTEMIC BLASTOMYCOSIS

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A case of systemic blastomycosis in a 40 year old man was reported recently by Drummond and Smith.¹ The patient developed a swollen, painful ankle, and this was followed shortly by a generalized skin eruption. A density was present at the apex of the right lung. He was suspected of being tuberculous, until 6 months later blastomycetes were discovered in the pus from the lesions and in the sputum. In view of the fact that Starrs and Klotz,² in a review of all Canadian cases of systemic blastomycosis, considered only two as definitely proved, a note on the subsequent course of Drummond and Smith's case may be of interest.

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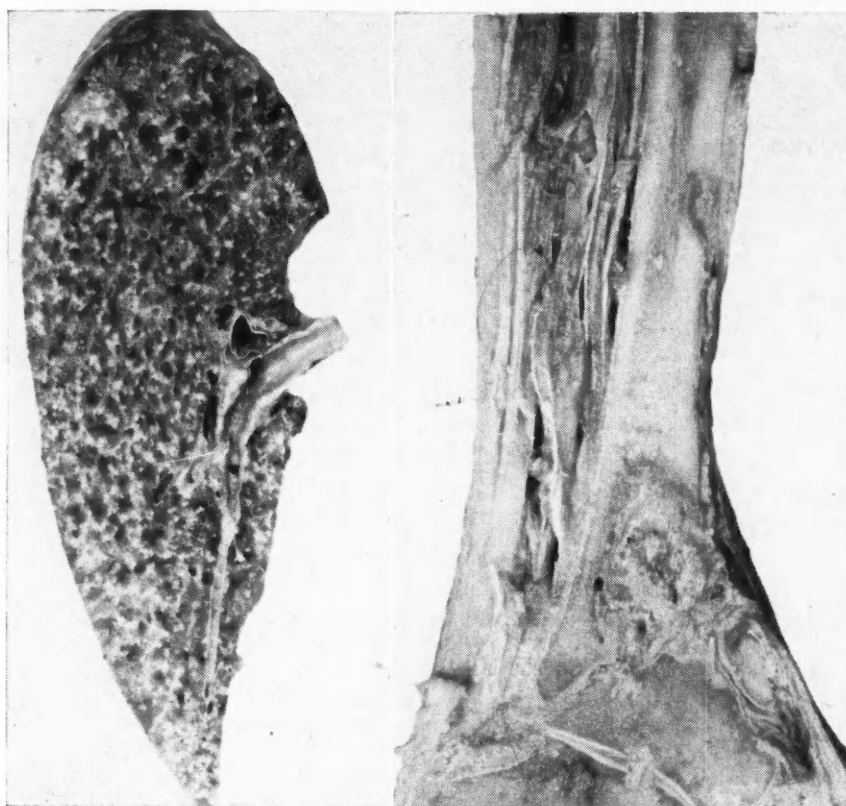


Fig. 1.—Section of left lung. The lung is consolidated and studded with small nodules. Fig. 2.—Amputated left leg, cut in half. A large abscess is present in the lower end of the tibia and smaller lesions higher up in the bone.

The patient at first responded well to treatment with large doses of potassium iodide (450 gr. daily), but then suffered a relapse with new crops of skin lesions. The pus from these and the sputum were loaded with blastomycetes. The left leg was finally amputated below the knee in an effort to remove the main focus of infection, but the patient shortly succumbed to the disease, 14 months after onset of symptoms.

Necropsy findings.—The skin of the whole body was covered by well demarcated lesions measuring about 1 cm. in diameter. These included papules, punched out ulcers and crusted sores, the latter mostly around the nostrils and mouth. Very widespread throughout the body were irregular, non-encapsulated abscesses filled with greenish pus. They were very numerous in the subcutaneous tissues, the spleen and left epididymis, the latter two organs having been converted into bags of pus by large, confluent abscesses. Smaller lesions were present in the thyroid, liver and prostate. The kidneys contained yellow round nodules and streaks, presenting a picture of an acute pyelonephritis. The brain showed a purulent meningitis over the vertex.

The lungs were very heavy, the right weighing 1,210 gm., the left 1,075 gm. Both were studded throughout with pinhead-sized, cream-coloured nodules (Fig. 1). The intervening lung parenchyma was consolidated by a confluent pneumonia, with only a few dilated air spaces remaining patent. There was no evidence of any primary lesion in the right apex which had shown a density on x-rays during life. The bronchial tree appeared uninvolved. The pericardial, pleural and peritoneal cavities contained moderate serous effusions. The amputated left leg contained a large abscess in the lower end of the

tibia with a soft tissue sinus extending to the surface of the skin (Fig. 2). Two smaller abscesses were present in the upper parts of the bone.

Sections from all the lesions showed abscesses containing intact and fragmented polymorphonuclears, surrounded by epithelioid cells and giant cells. Some of the smaller lesions consisted only of granulomatous nodules without suppuration. Yeast cells were seen in nearly all sections, often in very large numbers. Most of them consisted only of the empty capsule without cytoplasm. Many were engulfed by giant cells. Occasionally, budding forms were seen. In addition to the abscesses, the lungs showed a confluent pneumonia, the alveoli being filled with polymorphonuclears and fibrin. The brain was unfortunately lost before any sections could be taken.

Pus was aspirated from a large subcutaneous abscess on the left side of the forehead. A wet preparation of this contained numerous typical double-contoured yeasts, many of which had single buds. On Sabouraud's medium at room temperature, the fluffy white mycelium characteristic of *Blastomyces dermatitidis* was formed. Cultures on blood agar at 37° C. were overgrown by bacteria.

SUMMARY

Necropsy findings are presented on a case of disseminated blastomycosis with lesions in the skin, subcutaneous tissues, bone, meninges, thyroid, lungs, liver, spleen, kidneys, prostate and epididymis. Typical blastomycetes were seen in the sections and recovered on culture.

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SPECIAL ARTICLE

THE PHYSICIAN IN CIVIL DEFENCE*

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In a tense and turbulent world, a meeting like this might be understood with great difficulty by citizens of nations outside North America. I say it might be difficult for them because citizens of every nation do not exercise actively the rare privileges and freedoms we enjoy in North America. How do we know whether or not they would understand? Were they as fortunate as the citizens of Canada and the United States, it is unlikely that others would be less appreciative than we.

Here am I, an invited guest from another land, addressing you on a subject that concerns every citizen of your nation, his family, his home, his community—the very life, health and survival of Canada. Yet all of us, in Canada and the United States, likely would think little about it were we not to pause occasionally to revel in our long-standing friendship, in the mutual confidence existing between us, and in our joint pride of calm, confident acceptance of challenges to our respective futures—challenges of almost inconceivable proportions.

We know that our two nations are secure, because we shall face the future shoulder to shoulder. The ultimate of true friendship will evolve from our joint protection and defense of our families, our homes, and our most remote communities. This will be without regard to boundary lines, but with full cognizance that mutual civil defense of every community in Canada and the United States is of immediate and top priority to all of the citizens of both nations.

The Congress of the United States, in the recent Federal Civil Defense Act of 1950, has made it possible to proceed to our planning effectively with Canadian authorities for the civil defense of both nations. This has taken clear direction, following a civil defense mutual aid agreement between the two countries on March 27, 1951. The spirit of the agreement is indicated by quoting from the paper that "as far as possible, civil defence activities in the United States and Canada should be co-ordinated for the protection of persons and property from the result of enemy attack as if there were no border". At the same time there was set up a joint United States-Canadian Civil Defense Committee. Your distinguished Minister of National Health and Welfare, the Honourable Paul Martin, and Civil Defence Co-ordinator, Major-General F. F. Worthington, along with others, have honoured the United States with a

recent visit to implement the agreement.

In our United States Civil Defense Act, "civil defense" is defined in a manner indicating the priorities to be given to minimizing the effects upon the civilian population caused by an attack upon the country, to dealing with immediate emergency conditions that would be created, and to repairing or restoring vital utilities and facilities destroyed or damaged by any such attack. As the earliest parts of the Act are examined a physician cannot help sensing his potentially essential part in the survival of the nation if attack should come. He should, almost as immediately, review the possible circumstances and problems, and the procedures and methods most likely to assure effective, feasible, economical application of resources that may be available.

The physician first would need to become a teacher of preventive as well as therapeutic measures by which laymen, under medical training and supervision, will avert, minimize, or repair human damage. Physicians have hardly begun to assume their responsibilities in this field. At the same time they must continue their healing of the normally occurring sick and injured where these are critical in nature, rather than furnishing our luxury services. Physicians must continue and expand also the public health services, by calling in the aid and support of every conceivable related profession, art, or science, all then jointly teaching citizens their respective parts in achieving successful public health. A third great program of teaching will be that involved in the organization, training, supervision, and leadership of countless thousands of lay as well as professional personnel of the emergency medical or casualty and hospital services. A fourth objective would be to teach our civilian physicians about the medical and health problems of dislodged, homeless, and needy victims of direct enemy attacks, as well as of thousands who might be mass evacuees. It is in this field more than the others perhaps that physicians serving farm and non-farm rural areas may find their greatest opportunities for service. A fifth endeavour, markedly increased over that of peacetime would be development of training for rehabilitation services for those thousands of physical and mental casualties we can anticipate following attacks. Finally, in the health field, the physician must be prepared to teach the defenses against psychological warfare. More than any other group, physicians can and must achieve this. Health education, mental hygiene, panic or other mass reaction controls must be a daily duty of physicians, and all need to be undertaken in an intelligent manner.

To achieve these six important missions I have outlined will require admission by the physician that he must proceed along four lines of attack:

He must advance his own knowledge consistently.

He must impart his acquired knowledge to his professional allies and to the people, in understandable form.

* Presented to Montreal Medico-Chirurgical Society in its program on The Medical Aspects of Civilian Defence, Montreal, May 18, 1951.

He must conduct educational programs which will prepare the people against all physical, mental, and moral hazards created by enemy attacks, revising them as newer knowledge dictates.

He must apply every available material, psychological, spiritual or moral resource to maintain physical and mental health. This means that many physicians will be compelled to recall, or learn for the first time, the great significance of the human environment as related to personal health. He must exploit to a maximum degree such fundamental human welfare resources as water, food, clothing, shelter, warmth, individual and family security, home life—health essentials we take for granted so readily in peacetime as to make us overlook their importance in preparing for war.

The physician, more than any other person, is selected for these duties by his normal community responsibility and position. He comes into direct contact with more individuals and families, with more homes, from birth to death, than does one of any other profession. He can teach as he practises public health and prevention in the health departments, and as he heals the sick and injured.

Throughout the centuries people have looked to the physician for guidance and deliverance in time of personal disaster, epidemic, or other hazard to the family and the home. And what does the physician face now? Threat of disaster, an epidemic of fear, a sense of possible futility. It is true that some progress has been made in educating the public for civil defense. Much has been written, some truth and some half-truth, of the potential threat to our survival. The physician has fought to conquer not only the germs of disease but, since the days of the Great Physician, the evils of ignorance, prejudice, and superstition as well. To the physician of today no truth could be more self-evident than that fear decreases when the unknown becomes known. Hence, one ancient meaning of the word physician, a teacher, assumes the greatest importance of all time.

Once more the people are looking to the doctor to hold the torch for them through the gloom of bewilderment and frustration. It is for us to accept the challenge by bringing to every one of our people in this last great stronghold for survival, the Americas, an enlightened mind, a strong body, a courageous heart, in spite of any diabolical measures that a vicious and relentless enemy could contrive.

There must be no complacency among any of our physicians anywhere, even in our rural areas. Canada and the United States have more than 220,000 physicians, many admittedly not residing and practising their professions in areas likely to be hit by bombs, fire, or even worse attacks. Many of these physicians may be erring in a supposition that their own particular communities are not likely priority targets for enemy attacks. In total war an enemy might employ every known method of attack and deploy his resources for that attack unexpectedly. Presumably only large industrial-metropolitan areas normally would be the objectives of direct atomic bombing; but

smaller cities could be vulnerable to attacks by guided missiles, high explosive and incendiary bombs, and all would feel the effects of the agents of any type of attack directed at any community. Every community would be vulnerable to insidious attack, some in the form of sabotage and almost all to psychological warfare. A sneak attack upon a large city inevitably would become a concern of all other communities. It would destroy segments of the first line of medical defence in the attacked city—personnel as well as facilities—necessitating mutual aid and mobile support from communities outside the stricken area. In time of national disaster, or threat of it, all medical personnel and all medical auxiliaries everywhere should be "on call".

The ultimate objective of civil defence is good physical and mental health of the whole population. Once lost, manpower, productive skill, and the will to work in support of national survival cannot be replaced readily. Critical as material damage to our cities could be, the truly precious factors entrusted to the health and welfare services of civil defence are life, health, and effective production by the people. The maintenance of full civilian industrial support of a future war effort, therefore, depends upon the ability of our physicians to preserve maximum physical and mental health of civilians, or to restore it where interrupted.

Not only must war work be effective, but it is recognized that people will do such work only if they want and like to. Too much emphasis cannot be placed upon the fact that war introduces factors likely to reduce incentives for work, to enhance stresses tending to make effective work more difficult or even impossible, and finally, to reduce or remove a will to resist. Therefore, war work will be most effective only after we have classified and assigned people to respective duties commensurate with their physical and mental fitness for such duties. Intelligent war plans of opposing belligerents would capitalize on all of these matters to the maximum. Direct physical attacks designed to damage people, plant facilities, transportation means, communications and accurate information means, equipment and materials, comprise only one method by which an enemy could attempt to achieve victory. Psychological attacks upon the population would afford an enemy great potential effects also, particularly if his physical attacks are damaging at the time.

Two recent world conflicts ended favourably because North Americans could work effectively in cities that were readily defended, healthful, and attractive. It goes without saying that a confidence in our readiness for future and more difficult defense would promote mental health of all our people, but more particularly of essential war workers we would ask and expect to continue on the job despite enemy attacks or threats. That mental health can be assured only

by guarantees of physical health and the welfare for all employess, for their families, their homes, and the community. If interrupted in some cities by vicious enemy assaults, we shall restore the general health because we know what we should do, when we should do it, and how we could be sure to achieve it.

No single pattern may be applied to our civil defense health and welfare services in every North American city. That is due to a kaleidoscopic, ever-changing influence of complex social policies and organization, which are in turn peculiar to varied services, unusual geographic distributions of people, and mixed governmental, voluntary and individual participation in our normal peacetime community life. All of these must be adjusted to the varied vulnerability of different cities and the circumstances of enemy attack.

No one person, group, city, province, or state can prepare alone for civil defense. All of us must create a welfare, an environment which, although less than desirable, will tide the family, the home, and the community over the critical circumstances of enemy attack. The provinces and states and their subdivisions have responsibility for this.

The federal planning, co-ordination and guidance, as well as the provision of material assistance, under which the provinces and states, and communities, may repair personal wounds or other damages in those instances where prevention may fail, can go forward effectively only when given full support by advice and active participation of physicians. Maximum welfare demands civilian preventive measures and means to withstand the most vicious specialized weapons of destruction or damage an ingenious enemy could devise. These preventive techniques apply to and are applied equally by emergency welfare services and the health and medical services. Certain technical aspects of attack make necessary a third group, or special weapons defense services. Hence physicians must understand welfare, health, and special weapons defense services, as all are closely interrelated, and they must be integrated with their respective counterparts always in mind.

The collective manner in which we shall adjust so complex a social organization to survival from enemy attacks, and in which we adjust ourselves jointly to that organization, will determine the health not only of you, your family and your community, but perhaps of many generations to come, here and in many other countries. It is a grave responsibility charged to physicians. We shall want to proceed calmly and firmly, but also with mutually reasonable assurance as to the ultimate desirability of our acts. It is so important a mission that we should insist upon aiding in development of all of our plans, in the joint and integrated controls over our operations, and in wholesome multilateral support between us all-round. All of

this justifies some delays, some occasional sense of frustration.

In spite of possible handicaps, we need never become discouraged. We do need to think clearly and to improve our plans for action, unrelentingly, in three fields which we might summarize in the words of that eminent social reformer, John Ruskin:

"In order that people may be happy in their work, these three things are needed: They must be fit for it; they must not do too much of it; and they must have a sense of success in it."

Could classical health objectives of industrial medicine, environmental hygiene, mental hygiene, communicable disease control, sanitation, nutrition, be stated more adequately? If not, health education of more extensive and comprehensive nature than any undertaken previously by physicians is likely to be the most expedient medium for our efforts.

You will recall that civil defence must be implemented in three phases, and we must accept our mission with full understanding of these phases. At the present time we are in the "preparation for attack" phase, the complete objective of which should be a readiness at all times for a second phase called "during attack" and for the all-important third phase, namely, measures to be taken "following attack". While we are in the preparation phase, which could go on for many years, it is necessary that we participate voluntarily in all detailed organization, manning and equipment of units. Indeed, in the United States' preparation phase the Federal Civil Defence Act of 1950 precludes compulsion and depends upon voluntary participation by all citizens in their own communities. The law alone will not produce successful health and welfare services.

In recent months it has been stated frequently that physicians are so far ahead of others in United States civil defence that they can do little now except wait for detailed manuals or additional guides in order to organize medical units. Nothing could be more shortsighted, or further from safety if such a concept were to be accepted. Federal guides and manuals should be prepared only after all-round consultations leading to proper relationships visualized by our National Governments to exist between provincial, state, and municipal authorities and between various civil defence services. The physician must understand not only these relationships but also the timing of measures to be undertaken, as well as the phase existing at any one time. The Government should define the measures to be taken in preparation for anticipated attack, during attack and following attack, as it does also organizational equipment, materials and facilities. Thoughtful persons will realize that local application of these concepts according to our respective national patterns cannot and must not be achieved overnight in a complex social

order, unless one is prepared to accept potentially undesirable or even irreparable damage from ill-advised and stopgap social policies.

Physicians have not exhausted existing sources of new knowledge pertaining to civil defense. This is particularly true in technical aspects of modern weapons. There are sufficient references, training courses for key instructors, and training aids available to permit a wider spread of technical knowledge of the modern weapons and their effects, as they might be directed against civilians. Such training of the entire profession need not wait upon additional guides of any nature. In addition, many references are available to permit individual and group study of various possible organizations which would improve our general administrative knowledge and future performance, regardless of the uniform pattern for units ultimately to be proposed in federal manuals. Studies can be made also with reference to supply and logistical arrangements, a field not too well known by civilian physicians. If the medical leadership does not engage in such studies and does not stimulate and initiate them, but should limit itself entirely to details of a few manuals of the future, we shall have something less than the success we have a right to expect. As medical knowledge is increased through conferences, study groups and society journals, the informed advice from the profession, needed by governmental planners and voluntary civil defense services, will become available. As these programs are developed, it is your privilege to assure their acceptability. Until all of us do that we cannot visualize safety for most of our homes or the confidence of a public that all hazards of physical, mental and moral origin will be overcome, and that true community health will survive all such hazards.

Ultimately national patterns will guide us in our planning, organizing and administering a civil defence program. They would guide us also in planning for any disaster, co-ordinated with all necessary services of the community, such as communications, police, fire, engineering, transport, rescue and evacuation of casualties, first aid, sanitation, welfare, supplies. It is true that we can organize for our efforts with efficiency and economy.

We can do the following at once, and it will be of immense value later and would conflict in no way with future national civil defense planning:

1. We can learn the law.
2. We can, actively, search out and learn the local over-all civil defense organization, its direction and its nature.
3. We can initiate or join in local professional development of civil defense medical plans commensurate with the local over-all plans.
4. We can, through professional organization of our communities' physicians, contribute

to development of federal, provincial, state and local medical civil defense, and to its support, by aiding in recruiting and training countless thousands of nonprofessional volunteers, without which medical success is unlikely.

Dire predictions and discussions with reference to many varied and critical problems we may foresee may have encouraged a sense of frustration, of futility, of pessimism on the part of some. Nevertheless, a successful, well-meshed, efficient civil defense medical organization can be achieved. It undoubtedly will be achieved. The time when that may occur depends upon the nature of the medical leadership available at all levels, the success of planning, the simplicity of organizing and administering a reasonable system, the perfection of willing co-operation. Above all, it will depend upon the quality of leadership and continuing performance by medical staff members in key positions. Our medical profession has never failed to meet the challenge to provide leadership in critical periods of human history.

I need not tell you that in assuming this responsibility the physician accepts also the drudgeries, the frustrations, the impatience with himself and his brothers in seemingly inexcusable situations, in all phases of civil defense, from the first moment of planning to the actual test of those plans in the theatre of disaster. He may be compelled to perform his duties with insufficient means, with nothing more than he has immediately available wherever a disaster might occur. He will be forced to give only mass attention and treatment to injured thousands, instead of the coveted near-ideal treatment of an individual physician-patient relationship. He will be obliged, in the common interest and for the sake of national survival, to sort patients in an entirely impersonal manner and without regard for the order in which they may come under his medical surveillance. The patients themselves and their families and loved ones will understand and desire that all of this be done, if physicians will have previously informed and educated the public through channels and by techniques already available to us. This will require the most careful and uniform efforts of practising physicians and health departments, determined and followed by them jointly.

When each physician of our two great and beloved countries has given of his best, untiringly, unflinchingly, selflessly, for the common good of all, then and only then can he feel that he has "fought a good fight . . . has kept the faith".

In closing on this theme I want to pay tribute to that immortal Canadian physician, Dr. John McCrae. He left us every one a heritage we shall cherish long and justify fully when he challenged:

"If ye break faith with us who die
We shall not sleep, though poppies grow
In Flanders fields."

No. 3

In many cases of portal cirrhosis, however,

there is no history of protein or vitamin B deficiency, or of alcoholism. It was recently asserted that a number of these had suffered from infectious hepatitis. The implied association led us to investigate the outcome of treatment of 100 cases of infectious hepatitis at the Royal Victoria Hospital. The results were as follows: 5 died of subacute hepatic necrosis; 85 recovered within 60 days of onset; and 10 developed chronic hepatitis. In the latter group, 8 fully recovered and 2 developed cirrhosis, proved in one at autopsy and in the other by liver biopsy. This percentage, though small in terms of the number of cases with infectious hepatitis, is probably considerably greater than the incidence of cirrhosis in the total population. Prolonged follow-up is necessary for accurate correlation. One would suspect perhaps that 10 to 15% of cases of cirrhosis, in whom alcoholism and dietary inadequacies are excluded, will have a history of infectious hepatitis.

There is an interesting relationship between hepatic cirrhosis and ulcerative colitis. In a twenty-year period at this hospital, 8,700 autopsy reports contained 41 cases of ulcerative colitis of which 7.3% had cirrhosis of the liver. The general incidence of cirrhosis in this autopsy material was 1.6%. It is not unreasonable to assume that the marked protein depletion incidental to ulcerative colitis, is responsible for the increased incidence of cirrhosis in this disease.

The medical management of hepatic cirrhosis is dietary, and is based upon experimental work which produced cirrhosis by diets deficient in protein and vitamin B complex. All such diets had in common a lack of lipotropic agents. These substances (choline, methionine, etc.) decrease fat deposition in the liver or promote the removal of fat from the liver. A diet rich in protein is lipotropic. The casein fraction of milk products contains an abundance of methionine. The effect of intravenous amino-acid has not been shown to be superior to an adequate oral protein intake.

The diet of the cirrhotic should also be rich in carbohydrate. The amount of fat is not important. The lipotropic agents *per se* are thought to add little to the therapy of cirrhosis, provided that the patient is able to consume the prescribed diet. Crude liver stimulates the appetite and provides large amounts of vitamin B. Otherwise, the indications for its use are obscure.

Intravenously administered albumin is a useful adjunct to therapy, especially in the presence of ascites and when surgery (portacaval shunt) is contemplated. The protein level in the plasma may be raised more rapidly by this means, without the risk of producing homologous serum hepatitis.

The results of medical therapy in cirrhosis are not encouraging. It is most effectual in

those patients whose cirrhosis is superimposed upon fatty infiltration, notably in alcoholics. When cirrhosis has reached the stage of decompensation, treatment is usually of little use, though there are outstanding exceptions to this generalization.

The importance of early diagnosis must be stressed; for only in the incipient stages of the disease is the prognosis anything but grave. In a recently reported series of several hundred cases, one-quarter were diagnosed after ascites had developed and an additional 10% only following the first massive hæmatemesis. There is no presently available medical therapy which can cope with such advanced liver disease.

III. MEDICAL ASPECTS

The case for presentation is a 35 year old white male first seen on September 27, 1949. His complaints were those of swelling of the legs, increased abdominal girth and weight (17 pounds) co-incident with increasing fatigue and anorexia all steadily progressive over a period of some eight months. No other symptoms were elicited. Enquiry revealed a history of daily beer consumption of 2 to 4 quarts over a period of 10 to 12 years. Food intake was fair during the week but very inadequate on weekends and holidays.

Examination revealed the striking physical findings of a very thin-looking man with prominent abdomen. There were no vascular spiders on the face or trunk. The abdomen was rounded and distended with demonstrable fluid wave. The liver was palpable a hand's breadth below the costal margin, nodular and firm and not tender. The spleen was readily felt three fingerbreadths below the left costal margin. There was slight œdema of the legs. The remainder of the examination was quite negative.

Laboratory studies revealed slight depression of Hb. to 80% and red blood cell count to 4.4 million. There was reduction of the white blood cells to 3,400 per c.mm. with neutropenia and slight lymphopenia. The serum bilirubin was 0.55 mgm. % direct and 1.1 mgm. % total. Prothrombin time was normal at 16 seconds. Bromsulphthalein test showed 25.6 mgm. % retention (5 mgm. per kilo, 30 minute test). Plasma protein total was 7.26 mgm. % with albumen (markedly lowered at) 2.84 and globulin (elevated to) 4.42 mgm. %. Cephalin flocculation test 3 plus, thymol turbidity 12.1 units, flocculation five plus. A.C. and P.C. blood sugars were within normal range and blood Wassermann was negative. x-ray examination with barium showed the typical picture of œsophageal varices.

A diagnosis of cirrhosis of the liver being reasonably established he was put to bed on a high caloric, high protein diet (165 grams protein per day) supplemented with polyvitamin tablets. In addition, after initial sensitivity

tests he was given a crude liver extract preparation, intravenously in doses increasing to 20 c.c. daily.

Throughout his initial 2 weeks on therapy there was no difficulty in adjustment to the high protein, high caloric intake and there was decrease of 3 inches in the abdominal girth to 30 inches with loss of 12 pounds in weight to 142 pounds.

Addendum.—The therapy as outlined above was maintained for 35 days in hospital after which the patient went home symptomatically and clinically improved. Progress was not maintained and he returned to hospital in 6 weeks with increased ascites and hydrothorax. Downhill course was rapid and a sudden massive hæmatemesis on January 4, 1950, was the terminal event. Autopsy revealed portal cirrhosis of the liver with splenomegaly and oesophageal varices.

IV. SURGICAL ASPECTS

The prevention of recurring massive hæmorrhage and wasting ascites has been among the most frustrating problems confronting the profession for many years. Surgical management of these conditions met with little success until six years ago when Blakemore and Whipple performed their first splenorenal anastomosis. Blakemore's latest report records major portacaval shunts in over 100 cases of portal hypertension.

The diagnosis of portal hypertension is usually easy. The spleen is enlarged. There is anæmia, leukopenia and thrombocytopenia. There is frequently a history of hæmatemesis and the presence of oesophageal varices may be confirmed radiologically. If the block is intra-hepatic the liver is usually enlarged and its function tests to some extent impaired. If the block is extra-hepatic the liver is normal in size and function, except in rare cases of coincidental cirrhosis.

Diagnosis is more difficult and errors are commoner in the absence of cirrhosis and hæmorrhage. The non-specific blood picture of Banti's syndrome must be differentiated from those of other states such as leukæmia, Gaucher's disease, giant follicular hyperplasia and certain lymphomatous conditions. A marrow biopsy is therefore essential and usually lymphnode biopsy is also indicated.

If the obstruction is extra-hepatic, further localization is usually impossible before laparotomy. In a child with portal hypertension the probable condition is a cavernomatous transformation or other congenital anomaly of the portal vein itself. In an adult, with a history of pancreatitis, or of pancreatic cyst, it is quite likely that the obstruction is in the splenic vein. As a rule, however, accurate localization of the obstructive factor must await comparative pressure readings in various tributaries of the portal bed.

The only type of portal obstruction which may be cured by splenectomy alone is situated in the

splenic vein, distal to the gastric coronary and inferior mesenteric veins. Otherwise splenectomy is of use only in reducing the volume of portal blood and should not be performed unless the surgeon is prepared, when necessary, to do a splenorenal anastomosis.

Many shunting procedures have been devised for the relief of portal hypertension. The two most effective are as follows: (1) splenectomy and end-to-side anastomosis of the splenic vein to the left renal vein; and (2) end-to-side or side-to-side anastomosis of the portal vein to the inferior vena cava. The former is generally preferred in the presence of cirrhosis and the latter in the group of extra-hepatic obstructions; though Rousselot is convinced that splenectomy should always be basic to any operation for the relief of portal hypertension.

The selection of cases for portacaval shunts is simplified when the block is extra-hepatic. The indication for surgery is recurring hæmorrhage from oesophageal varices. Liver function is normal and ascites uncommon. Once the diagnosis is established, the patient may be rapidly prepared for operation. Portal hypertension complicating cirrhosis of the liver is a much more serious matter. Fortunately no more than 20% of cirrhotics develop congestive splenomegaly. In such cases one's decision must be governed by the extent of liver damage and by the capacity of the liver to respond to medical treatment. Suitable preoperative preparation of the patient may require many months.

Modern medical therapy has done much to diminish the incidence and severity of ascites complicating cirrhosis. Two factors, however, contribute to occasional failures. One is liver damage affecting notably the production of serum albumin. The other is portal hypertension. If, under treatment ascites persists, in spite of an adequate rise in serum albumin, portal hypertension must be present and may be proved by x-rays of the oesophagus. In this event the patient is a candidate for a portacaval shunt.

In the most experienced hands, portacaval anastomosis carries an overall operative mortality of 20%. When the block is extra-hepatic, the risk is halved. Subsequent hæmorrhage is encountered in at least 10% of splenorenal anastomoses. It is less common following the Eck fistula operation.

That portacaval anastomosis is a logical operation for the relief of portal hypertension appears to have been established. However, regardless of its success in the control of hæmorrhage and ascites, the majority of the cirrhotic group will succumb to liver failure within five years. Moreover, venous shunts in portal hypertension are subject to inevitable disadvantages in comparison with arterio-arterial or arterio-venous anastomoses. Once the pressure gradient has levelled off, the tendency to thrombosis is greatly increased; the veins are often abnormally friable; and, in the presence of liver damage, anti-coagulants must be used with particular care.

CLINICAL and LABORATORY NOTES

THE PATIENT'S VIEWPOINT

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Medical trends may come and go, but the patient goes on forever. New drugs, diagnostic facilities, consultative services have improved medical practice immeasurably, but the patient and his viewpoint, have remained essentially unaltered. Increased interest in things medical, which prompts him to read about the latest in medicine in lay journals, has only helped to confuse him.

It is my belief that many errors that occur in the course of medical practice have their basis in the following causes: (1) Misuse by the patient of medical terms. (2) Failure of the physician to read the patient's mind, or to read between the lines. (3) Poor history.

Misuse of terms is, of course, common to all classes. One must not be misled by the height of the intellectual level of the complainant. His knowledge of anatomy and physiology may be as low as among the less educated.

In the case of the foreign born, who come to you with an interpreter, one must be on guard, as the latter oftentimes knows as little English as the patient, and in his anxiety to help you, is tempted to make a diagnosis. This in turn influences your judgment and treatment.

The blame for an inadequate history does not always lie with the physician. Most patients do not realize or appreciate the value of a history. Their main objective appears to be the physical examination. They bring their body, like a car, into your garage, for you the mechanic, to discover any knocks or incipient breakdowns. Dentists are expected to find the location of an aching tooth. For this reason, the patient gets impatient when he is asked what to him are irrelevant questions. He wants to get down to the business of examining the part complained of.

Another fruitful source of error is the diagnosis based on the description of symptoms over the telephone. These are either greatly exaggerated or woefully underestimated. Many physicians have had the experience of finding the so-called very sick patient bending over the kitchen stove, preparing a meal.

To read a patient's mind is sometimes difficult. There may be a discrepancy between what he says and what he thinks. As a general rule, new patients do not tell all on their first visit. One isn't, therefore, expected to make a complete and final diagnosis at that time. Some very startling and relevant information is only given after the second or third visits.

In this connection, I would like to bring forward a few examples which illustrate some of the points mentioned above.

Patient.—Doctor, I want you to give me something for my ulcerated leg.

Meaning.—Don't jump to the conclusion that you are dealing with a varicose ulcer. The laity uses the term ulcer to mean an abscess. The frequently used expression, an ulcerated tooth is used to denote a dental abscess.

Patient.—I have a pain over my kidneys, doctor.

Meaning.—Dare him to show you where his kidneys are. You will be amazed how far they have travelled since you left college. One of my patients pointed to the gluteus maximus.

Patient.—Doctor, I have a terrible backache.

Meaning.—Now, the back covers a large acreage. The pain may be high in the posterior chest, or low in the sacral area. In the case of a female, she may not have a backache at all. The complaint is her way of suggesting to you to do a complete pelvic examination. If you omit this procedure, her opinion of you will reach a new low.

Patient.—I have a pain in my stomach.

Meaning.—Here again we are dealing with a diffuse area. Let the patient be more specific. It took me a long time to learn that the French Canadian uses the word stomach (*estomac*) and means chest. Don't rush into ordering a gastric series in his case.

Patient.—What is good for piles, doctor?

Meaning.—This is, without doubt, one of the commonest sources of errors in general practice, and may lead to very tragic consequences. One should never accept the patient's diagnosis in this field. The final diagnosis may vary between coccydinia, rectal carcinoma and Dhoobie's itch.

Enough examples have been given to show misuse of terms. In the next few paragraphs I would like to present a few examples of cases requiring a little mind reading on the part of the physician. This includes patients who come to you for "check ups". It is significant that insurance companies do not accept a "check up" as sufficient information on insurance applications.

1. A young, healthy unmarried woman comes in for a check up. It hardly needs elaborating as to what this patient is anxious to know. Her emotional state is such that she needs sympathy and encouragement at this time.

2. A young healthy unmarried male comes in for an examination. He is obviously nervous. This boy has spent several sleepless nights worrying about venereal disease. He has been unable to eat or concentrate on his work. In the majority of cases his worries are groundless. A little sedative and reassurance are necessary, after giving him the expected examination including a blood test, without which he will feel let down.

3. A middle aged female comes in for a check up. This patient may have some abnormal bleeding, or a lump in the breast. Here you must ask leading questions as otherwise you might miss out on the main complaint. Carcinoma is on her mind, and rightly so. It is up to you to either confirm or dispel her fears.

4. A man in his sixties who has not been to a doctor in years shows up at your office for a check up. This man has just lost his best friend with heart trouble, or cancer. He received a psychic jolt. That was the stimulus, which gave him sufficient courage to see you. Knowing these things, your approach to his problem is

different than it would be if he had somatic complaints.

5. Your receptionist comes in to inform you that an old friend of the family, who is passing through town, dropped in to say hello. After the usual hand shaking, and exchange of greetings, and talking about old friends, be sure to ask him how he is feeling. Above all, do not forget to take his blood pressure reading (the highest symbol of a good examination, among the laity). If you do not, you will have missed one of the main reasons for his call.

SUMMARY

Some common errors in general practice that have their basis in the patient's attitude are discussed.

A few illustrative examples are given.

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OBSERVATIONS ON BLOOD PRESSURE ESTIMATION

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It has been noted by various observers that the position of the arm will affect the blood pressure reading obtained by auscultation.^{1, 2, 3} This observation was brought to our attention and it was decided to investigate the problem further. It was deemed of importance especially in view of the alteration in the diastolic values. The significance is further enhanced because of the prognostic implication attached to diastolic readings. The latter is true, not only clinically, but in computing insurance risks.

The position of the arm which would most nearly approach a common denominator was taken to be the one in which the arm was horizontal. Such a position was one that anyone taking pressures could readily estimate and so create a standard. It was also the one most nearly constant in relation to the base of the heart whether the subject was supine or erect.

The following estimations were taken with a standard mercury manometer. When the patient was sitting or standing the arm was supported by the operator in the horizontal position. The cuff was rapidly inflated and deflated so as to minimize congestion. A minimum of two consecutive similar estimations was taken before accepting the reading. Only those pressures with clear distinct auscultatory end points are included in these observations.⁴

The patients used in this study as normal controls included random admissions to the surgical wards, interns and nurses. The remainder was made up of patients in the out patient clinics and the hospital wards.

To demonstrate the constancy of observations

taken with the arm in the horizontal position, 25 normal subjects were examined. Table I clearly demonstrates the uniformity of both the systolic and diastolic readings regardless of whether the patients were standing, sitting or lying.^{5, 6}

TABLE I.

	Lying	Sitting Horiz.	Depend.	Standing Horiz.	Depend.
25 Normal individuals Average of blood pressure readings	106/66	105/66	117/78	106/67	116/77

The importance of the arm position in estimating blood pressure is demonstrated by the recordings shown in Table II. It will be noted that all groups, regardless of whether in normal health, general illness or those with hypertension, show a drop in both systolic and diastolic pressure.

TABLE II.

	Arm dependent	Arm horizontal	Difference
15 Normal individuals . . .	122/82	112/70	10/12
35 Hospital patients.	147/91	139/83	8/8
50 Total (averages) .	134/86	125/76	9/10
11 Hypertensive (over 140/90) .	191/113	183/103	8/10

DISCUSSION

Kahn, in 1919,¹ published observations showing that the position of the arm affected the manometer reading and suggested that hydrostatic pressures of the column of blood plus vasomotor phenomena were responsible. Other authors have made similar observations.^{2, 3}

Whatever the cause of this change in observable pressure, it is an appreciable and significant difference.^{7, 8, 9} One needs only to note various individuals taking blood pressure in offices, hospitals and clinics to find some being taken with the patient in a chair and the arm almost horizontal on the desk, while others have their arm hanging by the side. A difference of 10 mm. of mercury in a diastolic pressure is sufficient to change an applicant for life insurance from one paying a standard premium to one having the premium rated up. The outlook for a patient with a constant diastolic pressure of 100 mm. of mercury is much brighter than that of one with a constant pressure of 110 mm. of mercury.

CONCLUSIONS

1. The difference between a blood pressure reading taken with the arm vertical and one with the arm horizontal shows an average fall in systolic blood pressure of 8 mm. of mercury and a diastolic fall of 10 mm.

2. Taking as a standard the arm in the horizontal position, no essential difference is shown in blood pressure reading with the subject lying, sitting or standing.

3. For purposes of uniformity in observations and of interpreting prognostic implication and insurance risks, it is suggested that the arm be maintained in a horizontal position when taking blood pressure readings.

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RESOLUTION ADOPTED ON CLASSIFICATIONS OF CERVICAL CANCER*

Whereas the so-called League of Nations' Classification of Carcinoma of the Uterine Cervix is now in common use in many countries, but is not used exclusively in the United States of America, it is desirable that this classification, or an acceptable modification thereof, be adopted universally in order to reach a common ground of understanding. Therefore, a Committee of duly appointed representatives of the Section of Obstetrics and Gynecology of the American Medical Association, the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, and the American Gynecological Society, meeting in session with the Editorial Committee of the Annual Report on the Results of Radiotherapy in Carcinoma of the Uterine Cervix on the occasion of the International and Fourth American Congress on Obstetrics and Gynecology at New York City on May 14 to 19, 1950, has agreed to propose the following modification of the classification adopted by the World Health Organization, N.Y., 1950.

Stage 0: Carcinoma in situ—also known as pre-invasive carcinoma, intra-epithelial carcinoma and similar conditions.

Stage I: The carcinoma is strictly confined to the cervix.

Stage II: The carcinoma extends beyond the cervix, but has not reached the pelvic wall. The carcinoma involves the vagina, but not the lower third.

Stage III: The carcinoma has reached the pelvic wall. (On rectal examination no "cancer-free" space is found between the tumour and the pelvic wall.) The carcinoma involves the lower third of the vagina.

Stage IV: The carcinoma involves the bladder or the rectum, or both, or has extended beyond the limits previously described.

* Reprinted from "The Mother" — July, 1950. Quarterly Bulletin of The American Committee on Maternal Welfare.

Be it resolved that this Classification be termed the International Classification of the Stages of Carcinoma of the Uterine Cervix, and that all organizations concerned with the problem on hand be approached to consider its adoption.

Mercurial Diuretics by Subcutaneous Route

The mercurial diuretics have the justified reputation of being the most powerful and consistently effective of all diuretic drugs. Calomel (mercurous chloride) was used as a diuretic by Paracelsus in the 16th century, and was an ingredient of the famous "Guy's Hospital pill" (calomel, squills and digitalis). In 1920 organic mercurials (merbaphen) were introduced as diuretics, followed in 1924 by a less toxic compound, salyrgan (mersalyl). Subsequently theophylline was linked to the molecule of the organic mercurial diuretic to give a product with even less toxicity. However, the available mercurial diuretics are still exceedingly irritating, necessitating deep intramuscular injection to avoid sloughs and excessive pain. Nevertheless, many patients complain of pain at the site of injection and nodule formation is not uncommon. The intravenous route avoids the local irritation, and produces a more rapid and profound diuresis, but occasionally is accompanied by severe toxic manifestations, and a fatal outcome, although rare, is a possibility that must always be kept in mind. Investigation in the experimental animal has demonstrated that death is caused by the action of these drugs on the heart, with ventricular fibrillation as the terminal event.

Attempts to reduce the toxicity of mercurial diuretics have led to a new type of compound recently made available under the name thiomerin. This drug is identical with mercuriophylline, (USP XIII) except that it contains sodium mercapto acetate in chemical combination with mercury instead of theophylline. In animal experiments it failed to produce the typical ventricular tachycardia and fibrillation which occurs after the other diuretics. Thiomerin also appears to be less toxic to tissue and has been proposed for clinical use by subcutaneous injection. In order to determine the reaction which mercurial diuretics produce at the site of injection, Lehman, Taube, and King,¹ have completed a detailed study with three mercurial diuretics, thiomerin, mercuranthin, and mercurhydrin. Thiomerin was tolerated by mice on subcutaneous injection without exhibiting gross pathology while mercuranthin and mercurhydrin gave rise to necrosis of the skin under the same conditions. After intramuscular injection in rats all three drugs gave an early inflammatory response characterized by the appearance of a polymorphonuclear exudate. In the case of thiomerin this exudate was entirely resorbed without evidence of residual damage. After injection of mercuranthin, or mercurhydrin, however, the irreversible nature of the response was indicated by marked fibroblastic proliferation. Lehman and co-workers felt that their results furnished adequate experimental basis for the clinical use of thiomerin by subcutaneous injection.

Several groups of investigators have studied the clinical use of thiomerin. Recently Batterman, Unterman, and DeGraff² have concluded that thiomerin is an effective and safe diuretic which may be administered subcutaneously to advantage with minimal irritation at the site of injection, that although the subcutaneous administration of this drug may result in slower diuresis, the predictability of a satisfactory diuretic response and the degree of diuresis achieved are similar to those noted with the intravenous use of mercuriophylline injection, and that thiomerin administered subcutaneously is superior to other mercurial diuretics administered intramuscularly.

J. H. DARRAGH

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(Information regarding contributions and advertising will be found on the second page following the reading material.)

EDITORIAL

THE REFILLING OF PRESCRIPTIONS

THERE is nothing complicated about giving prescriptions, especially in these days of simplified medication. Nor have trained pharmacists any difficulty in filling them. There should also be no difficulty in complying with the requirements of the Food and Drug Act in regard to those drugs which, in the interests of public health, are subject to a certain degree of control.

The restriction is of a very moderate nature. In essence, it is required that the drugs on this list are to be dispensed only on a properly signed prescription. Therefore, *each time* that a patient receives a further supply of such a drug the druggist should be given a covering prescription. Much of the nuisance of this repetition can be avoided by clearly stating on the original prescription whether it is to be repeated, and if so, how many times; and this is enough authority for the druggist. If nothing is said about refilling, the druggist is not permitted to supply more of the drug on the first prescription. The physician, however, may telephone the druggist to supply the refill, but must send a covering prescription as well within 72 hours; this for the protection of the druggist.

Of course, a physician may not always be able to decide at the beginning how many refills are to be allowed. But in many cases he should certainly keep in mind the possibility of a patient "wanting more". In such cases he should direct the druggist as he thinks best, preferably on the first prescription, but by written order in any event.

It seems that either the profession is not clearly enough informed on this point, or else in some instances not enough care is being taken to observe the requirements. The druggist is sometimes placed in an embarrassing position if

he refuses to refill a prescription which has no refill direction. In such circumstances it must be the experience of many physicians to receive from druggists requests to sign and return prescriptions; which is commendably gratuitous on the part of the druggist.

The prescribing of these drugs (on Appendix IV) involves a three-sided relationship between doctor, druggist, and patient, with the Department of National Health and Welfare holding a watching brief, and, we must add, exercising its power with great tolerance. This inter-relationship can only be maintained harmoniously by steadily adhering to the not very exacting regulations, and since we as a profession have the greater responsibility in the matter it is we who should most scrupulously observe what it entails.

The list of drugs on Appendix IV of the Food and Drugs Act is as follows:

Aminopyrine and any salt, homologue or derivative thereof.

Amphetamine and any salt thereof.

Aureomycin and any salt or derivative thereof.

Barbituric acid and any salt, homologue, or derivative thereof.

Cinchophen and Neocinchophen.

d-desoxyephedrine and any salt thereof.

Methedrine and any salt thereof.

Ortho-dinitrophenol and any compound, homologue, or derivative thereof.

Penicillin, its salts or derivatives, or preparations thereof, excluding preparations for oral use that contain not more than 3,000 International Units per dose.

Pervitin and any salt thereof.

Phenytoin Sodium.

Streptomycin and any compound thereof.

Sulfonamides and any salt, homologue, or derivative thereof.

Tetraethylthiuram disulphide.

Thiouracil and any homologue, or derivative thereof.

Thyroid.

Thyroxin and any salt thereof.

Urethane.

MEDICAL ASPECTS OF CIVIL DEFENCE

A SPECIAL article in the present issue by Colonel Wm. L. Wilson of the Federal Civil Defense Administration of Washington, draws attention to the problem of the medical aspects of civil defense in case of warfare. Colonel Wilson's address is peculiarly welcome. We believe it is the first instance of a public approach to this type of community of action between our country and the United States; in Colonel Wilson's words:

"The ultimate of true friendship will evolve from our joint protection and defence of our families, our homes and our most remote com-

munities. This will be without regard to boundary lines, but with full cognizance that mutual civil defense of every community in Canada and the United States is of immediate and top priority to all of the citizens of both nations."

Colonel Wilson deals with broad principles only, and in no sense compares the relative stages of preparation in the two countries, but the impression is inescapable that we in Canada have much to do in our civil defense planning. If it does nothing else this address should rouse us to a realization of the sober prospects before us. It should also impress us with the responsibility which faces the medical profession to a degree not applicable to any other civil profession.

Colonel Wilson has concrete suggestions as to what all of us can do now in preparing ourselves. We would urge a careful study of his paper. It is at once a warning, an exhortation and an inspiration.

Editorial Comment

Antibiotics and Chemotherapy

The ever increasing scope of the research and clinical developments in the fields of antibiotics, hormones and chemotherapeutics has indicated for some time a need for a specialized publication wherein papers reporting the newer developments and applications might be promptly published. We therefore extend a welcome to the new journal *Antibiotics and Chemotherapy* which commenced publication in April, 1951. This journal is also published in a Spanish edition under the title *Antibiotics y Quimioterapia*. Henry Welch, Ph.D. is the Editor-in-

Chief, and publication is under the editorial direction of a group of well known internationally recognized authorities. Both journals will be published monthly by the Washington Institute of Medicine.

C.H.C. Extension Course Available Next Autumn

Through the financial assistance of the W. K. Kellogg Foundation, the Canadian Hospital Council is now able to announce formally the setting up of an extension course in hospital organization and management. Preparations are under way to make the course available for the fall term this year.

This project is the outcome of the work of the Canadian Hospital Council, through its committee on education. Careful survey of the field showed that there was a strong demand for such training in hospital management. Plans were worked out to extend over a five year period involving a sum of \$110,000. This was presented to the W. K. Kellogg Foundation and their generous support has made it possible to carry it out.

Those interested in enrolling may secure application forms by writing to the Canadian Hospital Council offices, 280 Bloor Street W., Toronto. Further information will be published in later issues.

Tests for Intoxication

We would draw attention to the letter in our Correspondence Column from Dr. I. M. Rabino-witch regarding blood alcohol levels and intoxication. Where experts differ it is not for us to offer opinions, except to feel that there is probably a common ground for the points at issue which we may hope will become more clearly defined as time goes on. The whole subject has such wide implications that we would do well to follow it with close attention.

MEN and BOOKS

THE SURGERY OF GUY DE CHAULIAC

George H. Murphy, M.D.

Halifax, N.S.

This bit of writing concerns one of our art and craft who lived and wrought more than five centuries back. He was of a band of immortals that helped light the many gaps in the long, long story of our ancient profession. From such as these we sprung, and evolved, to become in our day a strong progressive, humanitarian organization in an otherwise chaotic

world.

To tell of such a man it is desirable to find some alignment for him in the great procession in which he marched and bore his torch. To keep the discipline of allotted time and the chairman's goodwill, I shall touch at but a few lighted peaks in our history, and from these seek a continuity for the life and work of one often called the Father of Surgery. What claim Guy De Chauliac has to such great distinction we shall try to suggest from his time and antecedents.

Hippocrates gave the world inductive reasoning, and set forever the basic technique of all scientific endeavour.

Celsus, of the Roman nobility, lived in the reign of Tiberius Cæsar. His writings had much to do with advancement in surgical technique under the Romans. The next giant figure that stands out across the centuries is Galen. He developed deduction and experiment, and with a superabundant confidence in all his works, dominated the practice of medicine and surgery for fourteen hundred years. The downfall of the Roman Empire, in the fifth century, put Roman and Grecian culture to rout, and medicine went with it. The field seems to have been cleared in Western Europe for the reign of the Dark Ages. Learning went to the East, and in this way were saved many of the great writings of Greece and Rome: among them Hippocrates, Galen and others.

The powerful Mohammedan Empire, which came into being later on, learned medicine from the Nestorian monks, a proscribed order of Christians who, after many wanderings, established a school of medicine at Gondispor in Persia. This school became the mother of Arabian medicine, the history of which is perhaps the only bright page up to the thirteenth century. The Arabian and Persian schools produced such men as Rhazes, Ali Abbas and Avicenna, Albucasis, Avenzoar and others.

Under the auspices of the enlightened Arabian caliphs, all the important Greek writings were translated into Arabian. The works of Galen and Hippocrates were so translated, and became the foundation of Arabian medicine. These works again found their way back into Europe, where they were translated into Latin; and not only these works, but those too of the Arabian physicians which were founded upon them. The Arabian influence was most intense at Montpellier, in France, on account of its closeness to the Moorish dominions, and through it the influence spread to Bologna and Paris.

It was while this Arabian influence was at its height that Guy De Chauliac took up the study of medicine. He was born in the village of Chauliac, on the frontier of Auvergne, France. The exact date of his birth is not known. The date of his death is given as the year 1368. His *Chirurgia Magna*, the work by which he is chiefly known, was written towards the end of his life. He states that he wrote for the solace of his old age, and the instruction of young practitioners. He had, therefore, the experience of what seems to have been a very busy life from which to evolve his system of surgery.

Not much is known of his early years except that he was under the patronage of the barons of Mercoeur in Auvergne, and for this reason, or by ecclesiastical patronage, he received his early education at Montpellier, which had been raised to the status of a University in 1220, and which, as already stated, was influenced much by Arabian medical teaching on account of its proximity to the Moorish dominions. He followed the usual course for educated men of his day and took "minor orders" and became a clerk. His bent was for medicine, however, and his becoming an ecclesiastic was intended to conform to a well recognized routine among Christians in those days who desired to enter the learned professions; they first became clerics. In his medical studies at Montpellier, Guy De Chauliac was under the direction of Raymond de Molieres, who was chancellor of the University and a master in medicine. Having obtained his medical degree of Master of Medicine in Montpellier, he went to Bologna in Italy, where he studied anatomy under

Bertrucius, and also under Albert of Bologna, both of whom are often quoted in the *Chirurgia Magna*. From Bologna he went to Paris, and the work of his teachers here is remembered, and quoted often in his book.

The title of Doctor was not the vogue of the universities of that date, and he speaks of himself as "Physicus". Like William of Salicet and others, he was a physician who practised surgery. For it should be remembered that the medical schools did not teach surgery as a special branch up to the sixteenth century. The divorcing of brain and hand placed the actual operations of surgery on a scale little higher than the butchers. The barbers were a sort of compromise, and they did the operative work. The operations, however, were of the most minor character. How the barber surgeons arose is not the purpose of this paper. But it seems clear enough that the forces which brought them into being had no support from Hippocrates and Galen, and many others of the really great. In the work of healing the sick, what the hand findeth to do, had an honoured place with such men as these; and this, too, was the teaching and practice of Guy De Chauliac.

He was not, then, a barber surgeon, but a clerk in Holy Orders, holding the degree of Master of Medicine, and practicing surgery; what we would call a professional surgeon to-day. It seems important to emphasize this, for it marks an epoch in the development of surgery as a specialty. Moreover, it presents to us the pleasing spectacle of a man of high cultural attainments practicing surgery and performing operations. It was his part to bring brain and hand together, and raise operative surgery from the debased position into which it had fallen. Thus, apart from his actual contributions to the art, he merits in a special way the title of Father of Surgery. Garrison says:

"He was the most erudite surgeon of his time. He had fine critical and historical sense, and was indeed the only medical historian of consequence between Celsus and Champier. He was emphatic in the importance he attached to a knowledge of human anatomy for the operating surgeon. He was the first to take the operation for hernia and cataract out of the hands of the strolling mountebanks."

Cancer he attacked with the knife and actual cautery, as well, also, as caries, anthrax, tumours and similar lesions. He used splints, slings and bandages in his treatment of fractures. In fractures of the thigh he employed pulleys and weights for extension, put the whole limb in a sling and in every detail relating to union of the bones, function of contiguous joints and general comfort of the patient, he evinced a resourcefulness of knowledge and technique which the present day student could study and practice to his profit.

He wrote extensively on the dentistry of the period. In connection with surgical and dental operative procedures, he writes of the soporific

or narcotic inhalation, which was the substitute for anaesthesia up to the seventeenth century. I have not been able to find any writings on the chemistry of this anaesthetic. The fact that inhalations are mentioned, suggests some compound resembling our present day products. The poppy was well known, of course, but this could hardly be the anaesthetic mentioned. Thirteenth century surgeons performed many major surgical operations, and were as zealous for first intention healing of their wounds as we are; and, according to some records, almost as successful. They did not know the real cause of infection, but they did know that cleaning the skin and washing with certain solutions caused these wounds to heal without pus. Alcohol was the favourite agent, or spirits of wine, as they called it. Oil and wine as a dressing for wounds came down from the remotest times; and we even find it mentioned in St. Luke's Gospel as applied by the Good Samaritan, to the wounds of the unfortunate man that "went down from Jerusalem to Jericho".

Guy De Chauliac followed the vogue of elaborate wound dressings. Garrison emphasizes this, and says:

"By his great authority, threw back the progress of surgery for some six centuries, giving his personal weight to the doctrine that the healing of a wound must be accomplished by the surgeon's interference—salves, plasters and other meddling—rather than by the healing power of nature".

I have read carefully De Chauliac's treatise on wounds, and while the use of plasters and various ointments are urged, they are not put forward as the primary force in the healing process. The contrary seems to be the case. For instance, opening his chapter on treatment of wounds, he says:

"The common object in every solution of continuity is union, which general and first intention is accomplished in two ways; first, by *Nature* as the principal worker, which operates by its own powers; and secondly, by the physician as a servant working with the five objects which are subalternate one to the other. The first object requires the removal of foreign substances, if there are any such among the divided parts; the second is to approximate the separated parts to each other; the third is to preserve the parts thus brought together in their proper form; the fourth is to conserve and preserve the substance of the organ; the fifth teaches how to correct complications".

It is in connection with the fifth requirement that Garrison's comment arises. For the chief complication was sepsis, and it was for this that De Chauliac, his predecessors, and successors up to Lister's day, expended much therapeutic resource in endeavouring to meet this distressing condition. In the light of our present knowledge, they were working in the wrong direction. But it is easy for the traveller who has reached the shining heights of his journey to look back along the path by which he came, observe the many tedious detours he

made, the many hardships endured, which might have been avoided had he only seen as he now sees. But by this route, he reached the coveted objective, and all its irregularities and mistakes are but marks, and perhaps necessary marks, in a great human effort towards better things. With the germ theory still in the womb of Time, one can see much good in the use of wound inunctions and the like. Even in our own day, they have their place. The medical historian is not necessarily a practical surgeon.

When a wound shows signs of inflammation in our day, we may apply hot antiseptic pads. De Chauliac, for the same condition, used fomentations of warm red oil with egg albumen added; and if the pain is very severe, he advises deadening the area, and orders that poppy be applied, as advised by William of Salicet. Wheaten bread dipped in boiling water is another fomentation he advised—probably the source of our familiar enough bread poultice.

His method of suturing a wound may be seen from the following: "The first way is with strong, even thread, as of silk, putting the first stitch in the middle of the wound, and another in the middle of the space which remains on each side, and thus proceeding with the other spaces until the whole is suitably sutured".

The *Great Surgery* of Guy De Chauliac comprises seven treatises, namely, on Anatomy, Aposthemata, Wounds, Ulcers, Fractures, Special Diseases, and an Antidotary. It was written in Latin, like all important works of the time. Nicaise, who translated the whole of De Chauliac's works into modern French, and is the best modern authority on his life, states the Latin used is not classical, but modified by Romanized Gaulish and many Arabic words and idioms. In his *Wounds and Fractures*, he is constantly quoting the authority of the leaders of the Arabian school: viz., Albucasis, Avenzoar, Avicenna and others. Of the Arabian school, the authority of Avicenna is most frequently invoked. Others mentioned are Gilbert, the Englishman, who was a professor at Montpellier in the thirteenth century; his former professors of Anatomy at Bologna, Betrucus and Albertus; Theodorus, another of his Bologna teachers, and William of Salicet, who died in 1280 and who was a great teacher at Bologna, and the author of several books. When not quoting what De Chauliac would have called the more modern writers, he goes direct to Galen. It is plain that Galen is regarded as the final arbiter in most surgical and medical problems. His authority is quoted when there is a clashing of opinion. It is likely that Galen's great name was called in more in controversial writings, where the question of downing an opponent bore a part, and that a good deal of freedom in practice was exercised by individual physicians and surgeons. De Chauliac, while referring to others' views, often sets them all

aside and follows his own course, pointing out the rationale of the procedure from observations made from previous experiences. Hippocrates is quoted, but as compared to Galen, rarely.

And now we may attempt to place De Chauliac in the great procession. As a torch-bearer, what part of the route does his light illumine? What right has he to the title of "Father of Surgery"?

If it be correct to measure a man's genius by his influence on the thought and action of succeeding generations, it would seem that Guy De Chauliac's place is assured. For, we are told that his *Chirurgia Magna* was the standard textbook in Europe up to the eighteenth century. He is credited with being the first to produce a complete work on surgery. Others wrote on surgical topics before him, as a part of general medical practice, but De Chauliac was a surgical specialist, and wrote and practiced as such. His influence was all against the degradation of surgery by placing operative work in the hands of ignorant men. His example and teaching in this regard must have had great effect. For, in point of general culture and educational attainments, he had few peers in his time. Besides, his position in the church carried the weight of his influence into wide fields, and gave a tinge of authority and eminence to his teaching. He was Professor of Surgery at Montpellier. He was at Avignon in 1348, and while here wrote a treatise on the Black Death, which is incorporated in his surgery. Garrison says he clung manfully to his post while many were deserting, and fought with what skill and science he knew, the terrors of those trying times. Fallopius compared De Chauliac to Hippocrates. Freind, in 1725, called him the Prince of Surgery. Malgaigne said that, Hippocrates excepted, there was no book in Greek, Latin or Arabic to be put above, or even on a level with De Chauliac's *Surgery*.

But apart from the scientific merit of his work, surgery owes him much. He made it a fit thing for men of the highest culture to practise. He, himself, was a scholastic, his whole life and career having followed hard on the perfection of scholastic philosophy as taught by Thomas Aquinas and others. He recognized that the healing art was an honest, and even a holy calling, and for them that would make it a cloak to cover immoral practices, he had nothing but contempt.

His high ethical principles need no better exemplification than is shown in his Introduction to his *Ars Chirurgia*, which I shall presently quote in full. There is refreshment for the surgeon to turn betimes to those eternal verities of our calling which, however unconscious he is of them, nevertheless govern the work of his brain and hand; for they are rooted deep in the past, and hold up proudly and firmly the superstructure of the medicine and surgery of

our own time.

What the surgeon ought to be, is thus set forth by Guy De Chauliac:

"The conditions necessary for the surgeon are four: First, he should be learned; second, he should be expert; third, he must be ingenious; and fourth, he should be able to adapt himself. It is required for the first, that the surgeon should know not only the principles of surgery, but also those of medicine in theory and practice; for the second, that he should have seen others operate; for the third, that he should be ingenious, of good judgment and memory to recognize conditions; and for the fourth, that he be adaptable and able to accommodate himself to circumstances. Let the surgeon be bold in all sure things, and fearful in dangerous things; let him avoid all faulty treatments and practices. He ought to be gracious to the sick, considerate to his associates, cautious in his prognostications. Let him be modest, dignified, gentle, pitiful, and merciful; not covetous nor an extortionist of money; but rather let his reward be according to his work, to the means of the patient, to the quality of the issue, and to his own dignity."

MEDICAL SOCIETIES

Montreal Medico-Chirurgical Society

The Montreal Medico-Chirurgical Society closed its sessions for the year with an all day meeting on May 18 devoted to the Medical Aspects of Civilian Defence. The intensely serious aspect of the subject was well brought out in the program which included in the morning addresses by Colonel J. N. B. Crawford on Atomic Warfare; Dr. R. L. Denton on Blood Transfusion problems in Major Disasters; and various special exhibits such as protective equipment; individual shelters; monitoring equipment for radiation; and graphic representations of estimated supply needs of a 150-bed hospital in a major disaster (prepared by the Herbert Reddy Memorial Hospital); and of blood transfusion equipment.

In the afternoon Major F. C. Pace of Camp Borden presented a concise review of the main aspects of Biological and Chemical Warfare. Actually, the threat of creating infections of epidemic proportions was limited by two main elements; first the impracticability of artificially causing epidemics and secondly the difficulty of producing enough infective agents of any one kind to be effective over large areas. Animal stocks would be attacked with far greater effect and possibly the attack would be directed at these and so at food supplies. He felt that the psychological effects of this form of warfare would be very considerable.

The threat from chemical warfare was far more grave. It had been found at the close of World War II that the Germans had developed more gases of extreme toxicity whose actual use had been withheld for various reasons. Unfortunately the knowledge of these gases was also now shared by the Russians. Their toxicity is so great that even very small amounts could be fatal and there were no means yet devised for detecting their presence other than the clinical effects on human beings. If treatment could be instituted, atropine was the drug of choice. But even after successfully combating it the patients would still need a period of 30 to 40 days of recuperation. The symptoms in order of appearance were irritation of the eyes, then of the throat, and finally bronchospasm with death. Protection by gas mask was possible, but the gas was so insidious, and effective in such minute amounts, that the mask had to fit very closely.

Dr. Campbell Gardner presented his views on the treatment of mass casualties. His experience in World War II in Great Britain enabled him to speak with authority, and this, combined with his forcefulness and lucidity, strongly impressed his audience. Dr. Gardner

discussed in detail the organization necessary for dealing with mass casualties; the type of buildings best suited for emergency centres; the formation of mobile operating and medical units; the necessity for relieving operators of prolonged strain. No one could have emphasized more sharply the urgency of planning ahead.

In the evening the annual meeting was addressed by Colonel Wm. L. Wilson, Assistant Administrator for Health and Welfare in the Federal Civil Defence Administration of the U.S.A. Colonel Wilson's excellent address was devoted not so much to detail as to what he termed the philosophy of his subject. He left no doubt in the minds of his audience of the urgent need for organization for civil defence, and he also brought out very clearly the tremendous responsibility which is thrown on the medical profession in this essential work.

Winnipeg Medical Society

The annual meeting of the Society was held in the Medical College on May 18. Certificates of life membership were presented to Drs. A. M. Campbell, A. T. Mathers, R. Rennie Swan and Sol Kobrinsky. Dr. K. R. Trueman, the retiring president gave a thoughtful address on "The Medical Society and Its Objectives".

The election of officers resulted as follows: President—Dr. S. A. Boyd; Vice-president—Dr. A. E. Childe; Secretary—Dr. Marjorie R. Bennett; Treasurer—Dr. K. Borthwick-Leslie; Trustee—Dr. David Swartz.

ROSS MITCHELL

CORRESPONDENCE

Folic Acid in Dumping Syndrome

To the Editor:

The "dumping syndrome" has been discussed and the inadequacy of treatment deplored following partial gastrectomy.

Recently I had this unusual experience: The patient, aged 51, who had recently had a partial gastrectomy for pyloric stenosis as a result of duodenal ulcer, presented the picture of marked diarrhoea and pains in the abdomen. The stools ranged from 8 to 14 daily and were loose, colourless and odourless.

Attempts to control this with sedatives such as sodium amytal, banthine and paregoric were unsuccessful. Dilute hydrochloric acid in therapeutic doses was given, also unsuccessful. Liver extract parenterally was tried with no effect. All these remedies were carried out for ten days with no results. X-ray investigation showed that the stoma was functioning perfectly, although somewhat precipitately.

Finally, in desperation, the thought crossed my mind that possibly this could be a deficiency disease akin to sprue, and accordingly folic acid was given orally in doses of 5 mgm. twice daily, with immediate gratifying results. The following day he only had 4 stools, the second day 2, and since that time he has had no more than 2 formed stools daily, although all medication except the folic acid has been discontinued.

I realize that it is difficult to draw conclusions from one case, but I feel that the observation is so interesting that it is worth drawing to your attention.

122 Bloor St. W.
Toronto, Ont.

CECIL YOUNG

Blood Alcohol Levels and Intoxication

To the Editor:

I have just read the article on "Blood Alcohol Levels and Intoxication" by Dr. D. K. Merkeley in the June number of the Journal.

This article is almost similar in tone to the criticism of my address before The American Medico-Legal Congress in 1940 by Drs. R. N. Harger and C. W. Muehlberger to which Dr. Merkeley refers (see *J. Criminal Law & Crim.*, 39: 402, 1948). I did not reply to the latter for two reasons: first—and I regret to have to say it—the criticism was not on a strictly scientific level and, second, it attacked the integrity of the late Professor A. T. Cameron, Professor of Biochemistry, University of Manitoba, because of his views which were exactly the same as my own.

As may be clearly seen in the opening remarks in the above-mentioned address, I pointed to the serious extent to which alcoholic intoxication is a contributing factor in crime and particularly in traffic accidents; the limitations of clinical tests and, thus, the great need of laboratory procedures. It was, however, necessary to recognize the very serious limitations of tests of urine, saliva and breath alcohol as an index of intoxication in medico-legal cases, compared with the test of blood, but, as I also showed, the latter also had its limitations.

With regard to the technical pitfalls to which I referred and which, in Dr. Merkeley's opinion, are "insignificant" and "would not occur in any laboratory deserving the name", the incontestable fact is that they have not been insignificant; they occurred in two of the best medico-legal laboratories in Canada, and, in one case, it was only by accident that I had discovered them and thus, I believe, prevented a possible miscarriage of justice in a trial for manslaughter, since the prosecution had built its case against the accused almost entirely upon the result of the blood test.

With regard to the statement that differences of concentration in plasma, serum and cells "have been shown . . . to be insignificant", all one need do is add a known quantity of ethyl alcohol to a known amount of blood known to be free from alcohol; allow the mixture to remain for no more than 10 minutes, then centrifuge the blood and determine the concentrations of alcohol in the red blood cells and in the plasma. It will then be found that the distribution of ethyl alcohol in the body tissues and fluids is roughly proportional to their water contents.

Dr. Merkeley would ignore the two cases reported by the Attorney-General's Office of Ontario to which I referred in the above-mentioned address, and also dismisses the two cases reported by Dr. Alexander O. Gettler of the Chief Medical Examiner's Office of the City of New York, with the statement that "there are few comparable figures in the literature." The only comment I have here is that there is probably no better-conducted medico-legal chemical laboratory anywhere than that of the Attorney-General's Office in Ontario and that of Dr. Gettler, and probably no person has had anywhere near the experience with laboratory tests for alcoholic intoxication that Dr. Gettler has had; as long as 24 years ago, it already had included over 6,000 chemical analyses of brain alone.

In my own experience, in one experiment, I had seen intoxication in a student with as little as 0.05% alcohol in the blood, yet, in another case, very little intoxication with as high a value as 0.273%. In these cases, I saw the person at the time the blood was collected; I obtained the sample of blood myself and also did the chemical analysis myself and, therefore, had first-hand knowledge of what had taken place.

With regard to the test of alcohol in the breath—the "Drunkometer" and its modifications—in my opinion, it cannot be stressed too often nor too strongly that this test has inherent in it such serious errors that it has no place in medico-legal investigation, if the purpose is to convict for drunkenness and not merely for drinking. Professors H. W. Haggard and L. A. Greenberg, at the Laboratory of Applied Physiology of Yale University, have clearly demonstrated the erroneous assumptions in the use of this apparatus—that the coefficient of distribution of alcohol between air and blood is not that which has been assigned by Dr. Harger in the "Drunkometer" test, namely, 1:2,000 but, as determined by them both *in vitro* and *in vivo*, about 1:1,300; that the concentration of alcohol in lung air cannot be correctly calculated from the concentration in mixed expired air on the

basis of carbon dioxide content of these airs, and, therefore, in all, to quote verbatim, that "the procedure now widely used in medico-legal investigation . . . is subject to serious errors" (*J. Lab. & Clin. Med.*, 26: 1527, 1941). In a letter to me on November 11, 1949, Professor Greenberg referred to the dangers of the use of the test in administration of justice and stated, to quote verbatim, "It is mainly for these reasons that we so seriously criticized some of the inaccuracies of some methods such as Hargar's Drunkometer".

It was gratifying to note that "the opinion and conclusions are those of the author and do not necessarily reflect the views or endorsements of the Royal Canadian Mounted Police", for I could enlarge very much upon convictions from evidence of laboratory tests which I trust will never occur in Canada. In my humble opinion, it would be a very tragic day for administration of justice in Canada, if these tests were ever employed in the manner in which I know from personal experiences they have been made use of elsewhere. In Canada, as in the administration of British justice elsewhere, the aim of the prosecution is not to convict, but to do justice to His Majesty's subjects—the accused as well as the people.

There is very little to be gained, nor does the Journal space permit of it, in dealing seriatim with the other points raised by Dr. Merkeley. Suffice it to say that I believe I have most of the world's literature on the subject and, from it, I know of no new development which, on strictly scientific grounds, makes it necessary to alter in any way whatsoever the opinion which I expressed in a Canadian Court of Law in 1939,* which was as follows:†

"Complete absence of alcohol in the blood is a complete answer to a charge of drunkenness. The finding of alcohol in the blood is incontestable proof that the individual had consumed alcohol. The higher the alcoholic content of the blood, the greater is the probability that the person was intoxicated; but this is a statistical conclusion. Being a statistical conclusion, it, therefore, may or may not, and need not necessarily, apply to the individual. In the case of the individual, there is no known concentration of alcohol in blood which, independent of all other evidence, indicates, with certainty, the extent to which the person was under the influence of alcohol. For a correct conclusion, valuable as the laboratory test may be, the laboratory finding must be correlated with the findings of the clinical examination."

Very sincerely yours,
I. M. RABINOWITCH.

Incidence and Cause of Stuttering

To the Editor:

I notice in the May issue of your Journal a short thesis on stuttering by E. Douglass.

Mr. Douglass states that stuttering affects about 1½% of Canada's population, or approximately 221,000 individuals. As a speech therapist I take issue with this statement and would estimate the incidence of stuttering, exclusive of other speech defects, at approximately 50,000. This figure is based on my own findings and those of Dr. Greene of the National Hospital of Speech Disorders in New York City. Dr. Greene's estimate of some 500,000 stutterers in the United States is founded on statistical information. Appreciating the fact that Canada's population is approximately one-

* Quebec Superior Court, September 7, 1939. The judgment is noted only at (1939) 4 D.L.R. 795, and was confirmed by the Court of King's Bench, (1942) 4 D.L.R. (220 sub nom., *American Automobile Insurance Co. v. Dickson*). An appeal to the Supreme Court of Canada was dismissed, (1943) S.C.R. 143; (1943) 2 D.L.R. 15.

† See *Can. Bar Rev.*, 26: 1437 (Dec.) 1948.

tenth of that of the United States, the estimate of Mr. Douglass is fantastic and without basis in fact.

Mr. Douglass says, "stuttering is nearly always a result of the sufferer's fear that he is going to stutter". It has been proved the basic causative factors are deeper than that; otherwise stuttering would not be the troublesome and baffling problem it really is.

Contrary to what Mr. Douglass says as to the development of stuttering, it is the writer's consideration that stuttering is true and very real to its victim regardless of whether that victim is six or sixty. The only difference is the progressive and ingrained involvement of personality maladjustment, with the cumulative behaviouristic and anti-social propensities which ultimately develop the victim into a neurotic, magnifying his nervous constitution (which he has always had and always will have) out of gear with the world, its people and the complications and realities of life in general.

WILLIAM JAMES NAUGHTON,
Director, Oro Club of Public Speaking
for Stammerers, Central Y.M.C.A.,
Toronto.

The London Letter

(From our own correspondent)

PROFESSIONAL FREEDOM

As Croonian Lecturer to the Royal College of Physicians of London this year, Dr. T. F. Fox, the editor of *The Lancet*, chose as his subject the vexed but important problem of professional freedom. The possibility of such freedom being lost, or at least impaired, is a very real one under the National Health Service, and Dr. Fox's review of the problem is timely. The danger is two-fold. In the first instance, there is the inevitable tendency for whoever controls the purse to want to have a say in how the money is spent. This might well mean direct control of doctors by administrators. The second danger is a more indirect one, and that is that by overloading the practitioner with work and clerical duties the administrator may deprive him of his sense of professional responsibility. As Dr. Fox expressively put it, "when too many patients come through the surgery door, professional freedom flies out of the window".

But, whilst emphasizing the fundamental importance of the concept that the doctor's primary responsibility is to his patients and not to any employer such as the State, he also pointed out that beneficial influences can be two-way. Was it possible that too much stress was being laid upon the dangers of the deleterious effect of the State upon medicine, and too little attention being paid to the possibility of medicine being able to exert a beneficial effect upon the State? A *modus vivendi* must be found, and in the search it must not be forgotten that "the democracies cannot survive unless their rulers can count on continual help from the professions, and certainly the professions cannot remain free if the democracies perish".

THE DELINQUENT ADOLESCENT

A report on "The Adolescent Delinquent Boy" has just been published by the joint committee on psychiatry and the law appointed by the British Medical Association and The Magistrates' Association. This provides an admirably succinct review of a problem of increasing importance. The size of the problem can be gauged from the fact that in 1938 the proportion of boys aged 12 and 13 years found guilty of indictable offences in the country, per 100,000 of the population in this age-group, was 1,213; by 1949 the figure had risen to 1,894. The corresponding figures for those aged 14 and 15 years were 1,132 and 1,855. The committee suggests that probably a comparable increase has occurred in the number of undetected offenders. Various factors are held to be responsible, including bad home influences, parental disharmony, and lack of parental supervision

and responsibility. Attention is also drawn to the deleterious effects of the employment in industry of mothers of young children. A complicating factor at the present moment is the raising of the school-leaving age from 14 to 15, as a certain number of the boys thus compelled to spend an extra year are potential or actual delinquents and this extra year at school may precipitate or aggravate their delinquency. The report contains a long series of recommendations for dealing with the problem, which are too long to be summarized here, but they should be studied by all interested in this problem.

A NOTABLE CENTENARY

With becoming pomp and ceremony the Royal Cancer Hospital has just celebrated the centenary of its foundation by Dr. William Marsden—the first hospital to be devoted entirely to the treatment of cancer. The celebrations opened with a reception at the hospital, attended by the Duchess of Gloucester. This was followed by a dinner at which one of the principal speakers was Lord Horder who was appointed to the staff of the hospital in 1908. One of his suggestions was that the name of the hospital should be changed to the Royal Chelsea Hospital. This is a suggestion that has been made before, to overcome the natural reluctance of a patient to go into a "cancer" hospital, and there are many who feel that the time has come when for the sake of the hospital and its patients the governors should give serious consideration to the change.

To many the most outstanding part of the celebrations was the two-day exhibition of its numerous activities which was arranged by the members of the Chester Beatty Research Institute. It is no criticism of the Royal Cancer Hospital to say that the greater part of its great reputation today is due to the magnificent series of fundamental contributions to our knowledge of cancer which have come from this Institute. Under its present Director, Professor Alexander Haddow, an already high standard is being steadily enhanced, and the series of demonstrations which were provided by the staff of the Institute was a striking tribute to the wide variety of interests covered by Professor Haddow and his staff.

NEW TROPICAL DISEASES HOSPITAL

The London Hospital for Tropical Diseases has had a curiously variegated career. Founded in 1899 by Sir Patrick Manson, with the support of Mr. Joseph Chamberlain, it was first housed in the Alberta Dock Hospital. After the 1914-18 war it was moved to Bloomsbury where it stayed until the outbreak of hostilities in 1939 when it was closed and the patients transferred to various London hospitals. During the 1939-45 war the premises were damaged by a landmine, and in 1945 a temporary hospital was opened in Devonshire Street. This soon proved to be hopelessly inadequate in size and facilities, and it soon became evident that unless larger and better premises could be obtained, London could not expect to provide a centre for the study of, and instruction in, tropical disease worthy of the metropolis of one of the greatest colonial powers in the world. Accommodation has now been found for it in the grounds of St. Pancras Hospital, and on May 24 the Duchess of Kent opened the new hospital. This has accommodation for 68 patients, with adequate space for teaching and research. There is also room for expansion, so that it now looks as if London had a clinical and teaching centre which will allow it to regain its prominent position as a teaching and research centre in tropical medicine.

London, June, 1951.

WILLIAM A. R. THOMSON

OBITUARIES

Dr. Albert Meldrum Arbuckle died on April 22 in Halifax at the age of 54. Born in Pictou, he was educated at Pictou Academy, Acadia University, from which he obtained his B.A. degree, and McGill University, where he graduated in medicine in 1928. Following graduation from McGill he served as house surgeon at the

Strong Memorial Hospital and the Rochester Municipal Hospital, Rochester, N.Y., and later was resident physician at the New York Polyclinic Hospital and Medical School. In 1936 he served as resident roentgenologist at the Quincy, Mass. City Hospital, then began specializing in chest work. He was assistant physician at the Rhode Island State Hospital for Tuberculosis, Wallun Lake, R.I., in 1937, then for three years assistant medical director of the T.B. division of the Belmont Hospital, Worcester, Mass.

He was a member of the Nova Scotia Medical Society, the National Tuberculosis Association, New York, and the American Association of Industrial Physicians and Surgeons. Since his return to Pictou, Dr. Arbuckle had taken an active part in community affairs, giving willingly of his time and effort in any movement for the betterment of the town. He was a member of the Board of Trade, an active worker on several committees of the Pictou-North Colchester Exhibition, a past president of the Men's Service Club of the Community Centre, and a past president of the Pictou Horticultural Society in whose work he took a deep interest. He was also a member of the Lobster Carnival Association and of the New Caledonian Curling Club. He was a member of First Presbyterian Church and of New Caledonia Lodge, No. 11, A.F. & A.M. He was unmarried.

Dr. Lazarus Bickel died of a heart attack in Winnipeg on April 21. He was 48. Born in Bukowina, a province of the former Austro-Hungarian monarchy, he studied medicine at the University of Bucharest, where he graduated in 1926. Subsequently Dr. Bickel studied at the University of Berlin, where he became associate professor in gynaecology and obstetrics. Dr. Bickel was president of the International Constantin Brunner Institute, a world-wide body whose aim is to foster philosophical study and practice of ethics. He is survived by his widow and a son.

Dr. Joseph Victor Charbonneau, aged 49, died suddenly on April 14 at Ste. Agathe, Que. A resident of Ste. Agathe for the last 12 years, Dr. Charbonneau was a director and one of the founders of the Hospital de la Providence here. Before coming here he practised in St. Donat. He studied at the Seminaire at Mont Laurier and received his medical degree from Laval University at Quebec. He is survived by a daughter, and a son.

Dr. James Victor Connell of Spencerville, Ont., died recently in Kingston General Hospital in his 73rd year. Dr. Connell was born in the "Connell Homestead" at Spencerville. He graduated from Queen's University in 1902 and had postgraduate surgical training in Edinburgh, New York and London. From 1904 to 1913 he practised at Indian Head, Sask., and later moved to Regina, Sask., where he had extensive surgical and consulting practice. For many years Dr. Connell took a prominent part in all professional activities and was one-time president of the Saskatchewan Medical Association. He was forced to give up his surgical practice in 1937 because of failing health.

Dr. Raymond W. Cramer, of London, Ont., died suddenly on May 3 at Westminster Hospital. Dr. Cramer, who had been on the staff of the hospital since the war, was president of the Canadian Badminton Association. A native of Guelph, he practised medicine there for a number of years. During World War II he served overseas with No. 10 Canadian General Hospital with the rank of major. For a short time he served at Crumlin Military Hospital after he returned from overseas service and later moved to Westminster Hospital where he was in charge of the new Western Counties wing. He was unmarried.

Dr. Bowman Corning Crowell, pathologist and an authority on cancer and on tropical diseases, died in Clermont, Florida, on April 26. Born in 1879 in Yarmouth, N.S., Dr. Crowell graduated in medicine from McGill University in 1904.

Dr. Charles F. Branch, Assistant Director of Clinical Research, American College of Surgeons, said in his annual report to the College in 1949: "Dr. Crowell's fetish for scientific honesty, his forthright pursuance of duty, and his strict adherence to the highest ideals were uncompromising. His ready humour, understanding, kindly sympathy, and warm friendship were unfailing. His broad grasp of the objectives and principles of the College and their development in relation to the humanitarian and sociological problems of the day was unequalled."

Dr. Crowell was a member of the Boards of Directors of the American Cancer Society and the Gorgas Memorial Institute. He was also a member of the National Malaria Commission.

Dr. John Maxwell Dale, aged 71, died on May 3 at Toronto East General Hospital. He had been ill for the last five years. Born in Oakwood, Dr. Dale attended Markham High School and graduated in medicine from the University of Toronto in 1905. Prior to coming to Toronto, he practised for a few years in Oakwood. He played golf with the East Toronto Medical Association and was a keen bowler. He was a life member of the Ontario Medical Association. He leaves his widow and one daughter.

Brig. Herbert Munro Elder, C.B.E., D.S.O., E.D., M.D.C.M., F.R.C.S.[C.], and formerly D.D.M.S. First Canadian Army, died on June 9, at the age of 52. A veteran of two world wars, Dr. Elder was born in Montreal and educated at Wykham House School and Lower Canada College. He enlisted as a bugler in the First World War at the age of 15, and went overseas with No. 3 Canadian General Hospital. Returning to Canada after four years overseas, he studied medicine and graduated from McGill University in 1922. After a two-year internship at the Montreal General Hospital he went into general practice, but pursued his interest in surgery under Dr. A. T. Bazin. Later he became medical officer with the Grenadier Guards, after which he transferred to the 9th Field Ambulance.

He rose to command of that unit and took it overseas in December, 1939. During the war he was transferred from England to the Italian zone and served there for a year after the invasion of Italy. Invalided to England, he became deputy-director of the medical services in the First Canadian Army. He served with them throughout the campaign in Europe. He resumed his practice here shortly after the war ended. He had been a member of the Medico-Chirurgical Society, a Fellow of the Royal College of Surgeons, Canada, and a past president of the Defence Medical Association. Surviving are his widow, the former Sybil Dick; a brother, A. H. Elder, K.C. and two children from a former marriage, John Elder, M.D., of Montreal, and Mrs. Elizabeth Graham Taylor, of Pittsburgh, Pa.

Dr. E. A. Frejd, aged 47, died at Victoria, B.C., on March 18. Dr. Frejd with his family moved to Victoria in the fall of 1949 after serving at Humphries Clinic in Prince Albert, Sask., for 10 years. He was born near Sault Ste. Marie. He interned at Regina General Hospital and practised in Ridgedale and Kinistino until 1937 when he went to Prince Albert. He is survived by his widow and four daughters.

Dr. W. Nelson Gourlay, aged 49, of Edmonton died on April 13 after a prolonged illness. Dr. Gourlay was born in Lacombe, where he received his public and secondary education. After teaching school at Lacombe, he was principal of Vermilion public school. Later he attended the University of Alberta graduating in medicine in 1933. After taking a two-year postgraduate course at University Hospital, he went to Drumheller where he commenced medical practice in 1935. In 1942 he joined the Royal Canadian Air Force and during the war years held the posts of chief surgeon at the technical training school at St. Thomas, Ont., surgical consultant at No. 4 training command in Toronto, and surgical consultant to Western Air Command in Vancouver. In

1946, he returned to private surgical practice in Edmonton and was a member of the teaching staff of the faculty of medicine at the university of medicine at the university. He also was on the staff of University Hospital. He was a Fellow of the Royal College of Surgeons of Canada, Fellow of the American College of Surgeons, vice-president of the Edmonton Academy of Medicine. He is survived by his widow and one daughter.

Lieut.-Col. George Garnet Greer died on April 4 in St. Catharines, Ont., in his 63rd year. He had been in failing health for some time. Born in Cold Springs, Ontario, he was a graduate of Queen's University in Arts and Toronto University in Medicine. He went overseas with the First Division in 1914 and remained abroad for the duration of the war, staying on the permanent staff of the army until his retirement in 1937. He came to St. Catharines ten years ago to take up residence. During the last war he was actively engaged in the blood donor's clinic here. During his long military career he was awarded the Military Cross, the Croix de Guerre and Palm. Besides his widow, he is survived by one son.

Dr. Claude M. Hall, who practiced in Cornwall, Ont., for almost 25 years, died at his home on February 25. He had been in failing health for several months. Born in Kenmore, Ont., in 1891, he attended public school at Kenmore and high school at Kemptville before entering Queen's University, Kingston, where he graduated in medicine in 1920. He practised for short times at Lancaster and Mountain Station before coming to Cornwall. He was a member of the Cornwall Medical Association, of Lodge No. 125, A.F. & A.M., and of Trinity Anglican Church. Surviving are his widow and one son.

Dr. Jean Le Sage, of Montreal, collapsed in his office on May 4 and died in the late afternoon at Ste. Jeanne D'Arc Hospital on his 48th birthday. Dr. Le Sage was born in Montreal. He was educated at St. Mary's College and then entered the University of Montreal for medical studies. Upon graduation in 1928 he was awarded a Provincial Government scholarship which took him to Paris where he specialized in gastroenterology for three years under the famous Professor Chiray. He returned to Montreal and took up the practice of his specialty. He served on the faculty of the University of Montreal for 5 years and was named a consultant at the Ste. Jeanne D'Arc Hospital and the Institute de Radium. He is survived by his widow and four children.

Dr. William Lloyd McGill, aged 53, died on April 18 at Sunnybrook Hospital, Toronto. He had been ill for several months. Born at Hillsburgh, he received his education in Toronto. He attended Harbord Collegiate. Dr. McGill served in the First World War with the 116th Battalion. After the war he entered the University of Toronto and graduated in medicine in 1924. He interned in Philadelphia. Returning to Toronto, he established a practice. He leaves a widow, two daughters, and one son.

Dr. William Morrison, pioneer doctor of Gilbert Plains, Man., died on April 29. Born and educated at Lucknow, Ont., he came to Manitoba and taught school for some years before entering Manitoba Medical College. Graduating in 1897, he practised medicine at Gilbert Plains for more than half a century. For several years he was a trustee of the local school. He is survived by his widow.

Dr. Norman W. Price, for 53 years an eye, nose and throat specialist in Niagara Falls, Ont., died at Memorial Hospital, in Niagara Falls, N.Y., in April, 1951. Dr. Price was 82 years old. He was an ardent gardener, and his garden, originally covering two or three acres, was one of the beauty spots of Niagara Falls. He studied at the University of Michigan and graduated in 1896 from the University of Toronto. He retired from practice seven years ago. He is survived by his widow and four children.

Dr. Joseph Hildege St. Aubin, aged 77, a resident of Stoney Point, Ont., for 37 years, died in hospital in Windsor on February 21. From 1917 to 1949 he was medical officer for Tilbury North. Born in St. Veloix de Valois, Quebec, he received his B.A. degree from the college at Joliette, Quebec. He graduated in medicine from a branch of Laval University in Montreal, later the University of Montreal, in 1898. He practiced in Stoney Point for 37 years. He is survived by his widow, four sons and three daughters.

Dr. Joseph L. Sanders of Ottawa, suffered a heart attack and died almost instantly on April 16. Dr. Sanders, who was 56, served in World War I with the Canadian Army, having enlisted in Montreal with the Irish Rangers. He was an honour graduate of McGill University in medicine in 1921. Dr. Sanders was born in Ottawa. He was educated at St. Patrick's school and Lisgar Collegiate. For a time he practised his profession in Arnprior, but was forced to relinquish his work owing to ill health attributed to his war services. Subsequently he became a member of the staff of the Veterans' Hospital, Kingston. He was then transferred to Ottawa where he served as medical adviser to the Canadian Pensions Commission. Chief survivors include his widow, three sons and two daughters.

Dr. Walter Scott of Westmount, Que., died on April 24 at his home in his 70th year. Dr. Scott was a graduate of McGill University. During the First World War he served in the Medical Corps. He spent many years in Newfoundland as medical officer for the Anglo-Newfoundland Development Company, a position from which he retired in 1946. He is survived by his widow, three sons and three daughters.

Dr. George Stewart Stewart, a resident of Hamilton and practitioner in the city for the last 39 years, died on March 31. Dr Stewart served in the First Great War with the Royal Army Medical Corps for over two years and for two years with the Royal Canadian Army Medical Corps. The deceased, who was 70 years of age, was born in Ruthven, Ont. He is survived by his widow, two sons and two daughters.

Dr. Tilley Strang Tupper, aged 79, prominent pioneer resident of Claresholm, Alta., died in April. Born near Fredericton, N.B., in 1872, he obtained his early education in that district and graduated from Fredericton Collegiate Institute. He was a second cousin of the late Sir Charles Tupper. He graduated from McGill University as a gold medallist in medicine in 1896 and came west in 1901. Dr. Tupper ranged cattle along the Little Bow River and a year later homesteaded in 160-acre prairie tract on Willow Creek near Claresholm. He resumed his medical practice with the coming of settlers in 1903. He was a member of the first village council and operated a pharmacy. At the outbreak of the First World War Dr. Tupper was medical officer on the Blood Reserve at Macleod and later served in France and England, earning the rank of Captain. From 1919 until his retirement in 1940, Dr. Tupper continued his practice and operated his farm at Claresholm. Surviving besides his widow, are two sons and two daughters.

NEWS ITEMS

News of the Medical Services Canadian Armed Forces

Surgeon Lieutenant Commander J. C. Grey, R.C.N., has been appointed to R.C.N. Hospital, Esquimalt, B.C., following nine months' service in *H.M.C.S. Cayuga* in Korean waters.

Dr. Christopher A. West, University of Toronto '50, was recently commissioned in the R.C.N. as a Surgeon Lieutenant.

Surgeon Lieutenant Commander J. W. Green, R.C.N., has commenced a six months' postgraduate course in Anaesthesiology in Vancouver, B.C., under Dr. Digby Leigh.

The 22nd annual meeting of the Aero Medical Association was held in the Shirley-Savoy Hotel, Denver, Colorado, May 14, 15 and 16, 1951, which was attended by various members of the Regular and Reserve R.C.A.F. Four papers were given from the Institute of Aviation Medicine and the Defence Research Medical Laboratories—"Some Aspects of Morbidity Among Service Personnel During Wartime"—by Dr. A. H. Sellers; "Motion Recording Devices used by the R.C.A.F. and Defence Research Medical Laboratories, in Motion Sickness Studies"—by Flight Lieutenant R. A. Stubbs; "The Visual Link Test for Pilot Aptitude as used by the R.C.A.F. in the Selection of Aircrew"—by Squadron Leader A. C. Burt and Flight Lieutenant E. P. Sloan; "Head Accelerations in the Motion Sickness Swing"—by Dr. C. C. Gotlieb.

A combined meeting of the Advisory Medical Committee to the R.C.A.F. and the Commanding Officers of the Reserve Medical Units was held May 5 and 6, 1951. General organization and function of the Medical Reserve of the R.C.A.F. was the main topic for discussion. The meeting was addressed by the Chief of the Air Staff—Air Marshal W. A. Curtis.

Dr. C. McCulloch, Consultant in Ophthalmology and Dr. T. J. Pashby of the R.C.A.F. Reserve, recently attended a conference on night vision training and aviation ophthalmology at the United States Air Force School of Aviation Medicine, Randolph Air Force Base, Texas.

The result of the annual competition for the Ryerson Cup and Shillington Cup, trophies brought forward for annual competition by the Defence Medical Association of Canada, was as follows: (1) Most efficient unit and winner of the Ryerson Cup for the year 1950-51 Field Ambulance, R.C.A.M.C., Toronto, Commanded by Lt.-Col. R. A. Mustard, M.B.E. (2) Runner-up, and winner of the Shillington Cup for the year 1950-51—24 Field Ambulance, R.C.A.M.C., Kitchener, Commanded by Lt.-Col. G. E. Duff Wilson.

Colonel K. A. Hunter, O.B.E., C.D., R.C.A.M.C., Command Medical Officer, Central Command and Colonel J. N. Crawford, M.B.E., E.D., R.C.A.M.C., Senior Consultant in the Directorate of Medical Services (Army) visited Japan and Korea with the object of collecting information on which to base a recommendation for medical coverage of the Canadian Brigade Group. The tour was of three weeks' duration. The chain of evacuation of casualties was followed from the most forward regimental aid posts to the general hospitals in Japan. Recommendations as to the advisable Canadian participation in the Medical sphere have been made to the Adjutant-General.

The following physicians have recently been appointed as consultants to the Director General of Medical Services (Army): Dr. Campbell Gardner, Montreal, Consultant in Surgery; Dr. R. Ian MacDonald, Toronto, Consultant in Internal Medicine; Dr. Milton H. Brown, Toronto, Consultant in Preventive Medicine; Dr. R. A. Gordon, C.D., Toronto, Consultant in Anaesthesia; Dr. W. A. Jones, O.B.E., V.D., C.D., Kingston, Consultant in Radiology; Dr. T. H. Coffey, London, Consultant in Physical Medicine; Dr. A. H. Neufeld, Montreal, Consultant in Laboratory Services; Dr. T. E. Dancy, Montreal, Consultant in Psychiatry; Dr. J. P. Gilhooley, Ottawa, Consultant in Ophthalmology.

Alberta

The annual refresher course was held at the University of Alberta from May 1 to 4, 1951. This was the most successful of the previous twenty courses.

Some three hundred were in attendance. The outside speakers being Dr. Robert B. Kerr, of the Faculty of Medicine of the University of British Columbia; Dr. G. Gavin Miller of McGill University; Dr. Davitt A. Felder, University of Minnesota; and Dr. Howard C. Stearns of the University of Oregon. Dr. John Macgregor, Professor of Pathology was the Chairman.

Dr. D. H. Husel a graduate of the University of Alberta, received his Specialist Certificate in gynaecology and obstetrics, from the Royal College of Surgeons and Physicians, and has joined the Allin Clinic of Edmonton.

Dr. Walter MacKenzie has returned from New York, where he attended surgical meetings associated with the American College of Surgeons in New York and Washington.

The new University of Alberta library was opened May 22. This is a great asset to the University and allows for greater educational expansion. It has one of the most well equipped, and efficiently arranged libraries in Canadian universities. Each department of the University has its own section. The library was named after Dr. A. C. Rutherford, the first Premier and Minister of Education of the Province of Alberta.

W. C. WHITESIDE

British Columbia

The various hospitals of British Columbia have been having graduating classes from their Training Schools for Nurses—the Vancouver General Hospital and St. Paul's Hospital in Vancouver—and the Royal Jubilee and St. Joseph's Hospitals in Victoria, amongst the big hospitals—and some three hundred new registered nurses have been added to the ranks of nursing. Even so, there is always a shortage of nurses, which may be more readily understood when one sees the large number that get married soon after graduation. This shortage is one of the main problems to be considered in the building of new hospital beds.

Large building programs are now in course of completion, or are being contemplated. St. Joseph's Hospital of Victoria, for instance, is being enlarged, 128 new beds being added. The Vancouver General Hospital is soon, we are told, to build 500 new beds, and St. Vincent's Hospital and Mount St. Joseph, also of Vancouver, have plans for new additions. The cost of building at this time is very high, and this is causing a good deal of trouble in the financing of the new projects.

A recent visitor to Vancouver was Dr. W. B. McKechnie of Armstrong. Dr. McKechnie was for many years in practice in Vancouver, and was known as a most competent surgeon and obstetrician. He served in the First Great War overseas, was an alderman of the City of Vancouver, and made himself generally useful in the affairs of his city and country. He had made up his mind, early in life, that he would practice medicine for twenty-five years, and then retire and go farming—and he did just that—becoming a most successful farmer too. It must be all of twenty-five years since he entered on this phase of his life, and he is still very active in his chosen occupation. His visit to Vancouver was to attend the christening of his great-grandchild.

It is with great interest that we record the following. Dr. Norman Goodwin, of Vancouver, M.D., C.M., (McGill '47) has recently taken the degree of LL.B. at the University of British Columbia. It is not often that this happens, and perhaps it would be a good thing if it happened oftener. Dr. Goodwin has not yet decided which of his professions he will follow, but he should be a very valuable man in the community. He played rugby and tennis at the U.B.C., was on the university rowing team, and was outstanding in athletics.

The East Kootenay area has a most active Health Unit. Its staff of nurses is to be increased to six, one of whom will be stationed at Kimberley. In addition, a children's dentist project is under way, and has been by the City Council and School Boards of Fernie and Kimberley. There are four districts covered by the Unit, and when one or more of these districts endorses the plan, it will be put into operation. These Health Units are operating in many parts of the Province, under the Provincial Board of Health; and do most valuable work.

The British Columbia Cancer Institute has undertaken the construction of a new building at the corner of Heather Street and Eleventh Avenue in Vancouver. It will be completed early in 1952, and will cost some \$650,000.00. It will be adapted for further extensions later. The equipment of the Institute is to be added to largely, we are told, in the department of radiation therapy, and it is hoped to have more beds available for institutional treatment.

In connection with the treatment of cancer in Canada, it is interesting to note the recommendation of the Canadian Cancer Society that radiation therapy centres be planned to serve population units of one million, cutting across provincial boundaries if necessary.

Dr. Ethlyn Trapp of Vancouver has been appointed to head a Committee which will study this recommendation, and bring in a report.

A new eight-room building to be used as a medical clinic is being built at Whaletown on Cortez Island by the Columbia Coast Mission, which, through the past nearly fifty years has been so active in bringing modern medical methods and hospital facilities to the people of the Coast areas of the Province. The project was financed by residents of Whaletown and other Cortez Island communities, and includes an anonymous donation of \$1,000 as well as a government grant. The C.C.M. itself will meet the remainder of the costs.

Another B.C. town, Quesnel, is contemplating the erection of a 40-bed hospital in the near future. It will cost \$320,000.00.

The record for blood donors has been set by Kamloops, in a recent Red Cross drive lasting five days. Out of a total population of 12,000 people, 2,086 gave their blood. Dr. B. P. L. Moore, director of the Red Cross Blood Transfusion Service, describes this as "certainly a North American record, if not a world one".

A wave of rabies is said to be sweeping through the State of Washington to the south of B.C., and it has reached Port Angeles, a point very close to Vancouver Island. The inhabitants of Greater Victoria have been warned by local veterinary authorities to be on the lookout for signs of the disease in dogs, and to have any dog-bites seen by a medical man. The situation in Washington seems to be well under control by the Health authorities, but all care is being taken on this side of the border. Many years ago there was an outbreak in the Duncan area of the Island, and it proved difficult to control.

The Crease Clinic of Psychological Medicine at Esson-dale has received one of the six citations given annually by the American Psychiatric Association, to hospitals that in the previous three years have developed outstanding techniques and methods, tending towards improvement in the care and treatment of patients.

An estimated half million dollars will be spent by the Roman Catholic order, the Sisters of the Love of Jesus, to establish a home for the aged, and a 200-bed hospital at Colwood, Vancouver Island. The property on which this will be built is a nine-acre site adjoining the Royal Colwood Golf Course, about seven miles from Victoria. The hospital will be equipped for any emergency care, and is to be regarded as "part of the contribution to home defense work".

One of the greatest difficulties confronting police officers who make arrests of dangerous drivers, is the question of intoxication. It is increasingly difficult to prove a degree of intoxication that will put the offender in the category of "drunken drivers". A machine, with the cacophonous but expressive title "drunkometer" is in use in certain American cities, and is said to be very accurate. Lately one of these machines was brought over to Vancouver, and considerable pomp and ceremony attended its arrival. Under the escort of two Seattle police captains it arrived at the Vancouver city limits, where it was met by a caravan of Junior Chamber of Commerce cars, and more police, and taken to the Hotel Vancouver, where several citizens offered their services as guinea-pigs for the testing of the machine's capabilities. We do not yet know whether it has been adopted for use by the City of Vancouver. J. H. MACDERMOT

Manitoba

Dr. E. T. Feldsted, Winnipeg born physician, has returned home from a two-year postgraduate course in radiotherapy, mainly at the Royal Cancer Hospital, and at cancer centres in Manchester and Edinburgh. After completing his visit here, he will go to the new British Columbia Medical Research Institute where he will be responsible for the use of radioactive isotopes in the treatment of cancer.

Dr. J. A. Hildes, assistant professor of physiology and medical research, University of Manitoba, has been appointed medical director of Winnipeg's municipal hospitals, the King Edward, King George and Princess Elizabeth. He succeeds Dr. J. L. Downey who resigned in order to engage in private practice.

The remarkable decline in communicable disease has led to a proposal that one or both of the municipal hospitals now housing patients of this kind might be converted to other uses in the near future. It is possible that King Edward or King George Hospital might become a second hospital for aged and infirm people.

Dr. Sheila Sherlock gave an interesting address on "The Etiology of Hepatic Cirrhosis" in the Winnipeg General Hospital Board Room on May 18. It was the fifth in a series of Tisdall Memorial Lectures.

Dr. Jans Dedichen, Oslo, Norway, delivered the fourth Tisdall Memorial Lecture in the Medical College, Winnipeg, on April 6. His subject was "Hemopoietic Factors in Liver Extract and their Significance to the Pathogenesis of Pernicious Anæmia".

A \$20,000 scholarship fund has been donated to the Manitoba Institute of Medical Education and Research. The grant was made by Miss Agnes B. Dougall in memory of her sister. Rev. Dr. J. H. Riddell also donated \$250 to be used for research.

ROSS MITCHELL

New Brunswick

Dr. Irene Allen attended the Canadian Tuberculosis Association at Toronto and the National Tuberculosis Association at Cincinnati.

Dr. Stephen Weyman was recently appointed chairman of the disaster service organization of the New Brunswick Division of the Red Cross Society. The appointment was made in co-operation with the New Brunswick Medical Society.

The annual meeting of the Saint John Medical Society was held this year at the Riverside Golf Club. Dr. Frank Stuart, vice-president, was chairman. The dining room of the Club was taxed to capacity by a large attendance. The dinner was good—the accompanying racket was as boisterous and happy as only

physicians can make it and the evening was climaxed by an address by Dr. Chas. Gass of Sackville. His subject was "Sleep". The speaker in his happiest mood quoted selected lines from the Psalms, Shakespeare and Keats, in a manner recognized as peculiarly his own, to the delight and instruction of his audience.

Dr. K. A. Baird of Saint John, recently attended the meeting of the American Academy of Allergy in New York and the American College of Allergists in Chicago. At the latter meeting Dr. Baird had a paper on the program.

Dr. E. A. Petrie, of Saint John is undergoing treatment at the Montreal Neurological Institute. His convalescence following a severe pelvic injury in January has been slow.

Dr. Robert Washburn of Saint John attended the meeting of the Diabetic Association in Philadelphia. A. S. KIRKLAND

Nova Scotia

Full of pride, hope and ambition Dalhousie's 55 medical graduates for 1951 are already spreading through the Maritimes and over the continent to their chosen fields. Approximately one-half of the class will go into general practice, five of them in the Halifax area alone; the other half go on to further studies in preparation for qualification in the specialties. Winner of the University Gold Medal was Dr. James Vibert, Stewiacke, Nova Scotia.

The Pictou County Medical Association in annual session at New Glasgow elected as President Dr. C. B. Smith, Pictou, Vice-President, Dr. Joseph MacDonald, Stellarton, Secretary-Treasurer, Dr. Stewart Dunn, Pictou. As special speakers at the meeting were Dr. Clarence Gosse and Dr. Martin Hoffman of Dalhousie University. Also present were C.M.A. President Dr. Norman Gosse and Dr. J. J. Carroll, President of the Nova Scotia Division.

Digby's General Hospital faces financial crisis stemming, according to its Board of Directors, from (a) a serious reduction in the number of patient days, (b) substantial wage and salary increases, (c) increased operation costs due to price advances, (d) extensive, necessary repairs, (e) failure of patients to pay their bills. The first four of these items are beyond control of the management. The hospital can be kept in operation only by the immediate provision of adequate revenue. This can come in part from drastic increase of hospital rates which in turn may bring about a further reduction in the number of patient days. Further aid from the public is, therefore, the most important single factor to prevent closing of the hospital's doors.

Dr. John F. L. Woodbury of Halifax has been awarded a Fellowship by the Canadian Arthritis and Rheumatism Society. Dr. Woodbury will continue his studies at Toronto's Sunnybrook Hospital.

The Victoria General Hospital, Halifax, held its own convocation for its graduating intern class. Thirty-eight young men and women received their certificates of internship from Dr. P. S. Campbell, Deputy Minister of Health. To Dr. John Quigley, Halifax, went the Superintendent's prize; to Dr. Douglas Lewis, Sackville, New Brunswick, the Staff prize; to Dr. James Vibert, Stewiacke, and Dr. Donald Rice, Bedford, as joint winners, the Victoria General Hospital prize.

Unheard from in the interior of Communist China for several months, Dr. Ian Robb, of Bridgetown, Medical Missionary with the United Church, has been reported safe and enroute home to Canada.

Dr. John Goddin, New Glasgow, has been awarded a fellowship in pathology at Mayo Clinic where he will work under Dr. Malcolm B. Dockerty.

Dr. William J. McNally of Montreal, (Dalhousie '22) was the recipient of an LL.D. *honoris causa*, at the convocation exercises of St. Francis Xavier University. Dr. McNally gave the convocation address to the graduates.

The Nova Scotia Division of the Committee on Trauma, American College of Surgeons, held a one day clinical meeting in Halifax at the Victoria Hospital and Halifax Infirmary. Clinical presentations were made by the staff surgeons. Visiting speakers were Dr. Donald Thompson, Bathurst, Dr. John Hogg, Yarmouth and Dr. Martin Hoffman, Dalhousie University.

Dr. N. B. Trask was awarded the intern prize at the Halifax Infirmary for outstanding work during the past year.

Four Nova Scotians were among the first medical graduating class of Ottawa University: Drs. Thomas McKeough, Sydney Mines, Charles W. MacLeod, Dunvegan, William R. Barton, Halifax, and Harold S. McDonald, Sydney. ARTHUR L. MURPHY

Ontario

Hon. Dr. Herbert A. Bruce, a former lieutenant-governor of Ontario, laid the corner stone of Toronto's second Osler Hall. The new hall is a \$200,000 extension of the Academy of Medicine. It will provide space for the 35,000 volume library. The auditorium will hold 375 of the academy's members when they attend evening meetings. The first Osler Hall was built in 1921 at 13 Queen's Park. The academy itself was organized in 1907 with Dr. J. F. W. Ross as president. His son, Dr. J. W. Ross, is now president.

Invocation of the corner stone ceremony was made by Dr. F. H. Cosgrave, Trinity College. Among those present were Dr. Norman B. Gwyn, nephew of the late Sir William Osler; Dr. Sydney Smith, president of the University of Toronto; Dr. R. T. Noble, who was president of the Academy during the building of the first Osler Hall, and Dr. Harris McPhedran, representing the Canadian Medical Association. Tea was served later in the library by Miss Edna Poole, assisted by Miss Olive Hurrell and Miss Marian Patterson of the academy staff.

Dr. Anthony Paddon, superintendent of Grenfell Hospital, Northwest River, Labrador, told the annual meeting of the Toronto branch of the Grenfell Labrador Medical Mission that the general health of the people of Newfoundland and Labrador has greatly improved since Confederation. Government aid has raised the spirits of the people and made them appreciative of the increasing medical services available through the Grenfell hospitals and ships.

The Governor-General of Canada, Viscount Alexander of Tunis, opened the new \$3,200,000 Kitchener-Waterloo Hospital on May 25. The new hospital includes a chapel completely furnished by the Protestant churches of the two cities. Fifteen minute services will be broadcast daily to the patients. Chronic patients will have 117 beds reserved for their use. In addition to these the new building will accommodate 347 beds and 75 bassinets. The net cost of a bed in the hospital was less than \$8,000. One of the interesting features of the hospital is the electrically operated laundry.

Dr. J. F. Sparks of Kingston has been elected president of the 86th annual session of the Ontario College of Physicians and Surgeons. Dr. Carl E. Hill of Lansing is vice-president. Committees named were: Executive—Dr. J. A. Dauphinee, Dr. Carl E. Hill, Dr. J. H. McPhedran, Toronto; Dr. J. F. Sparks, Kingston; Dr.

Ward Woolner, Ayr. Discipline—Dr. Malcolm Brown, Kingston; Dr. M. H. V. Cameron, Toronto; Dr. J. C. Gillie, Fort William; Dr. R. S. Murray, Stratford; Dr. John Sheahan, St. Catharines. Education and Registration—Dr. J. F. Argue, Ottawa; Dr. Malcolm Brown, Dr. J. A. Dauphinee, Dr. F. S. Brien, London; Dr. A. L. Richard, Ottawa. Legislation, advisory, rules and regulations—Dr. J. F. Argue, Dr. J. H. McPhedran, Dr. R. S. Murray, Dr. F. S. Brien, Dr. A. L. Richard, Dr. John Sheahan, Dr. D. S. Wigle, Windsor. Finance, printing and property—Dr. M. H. V. Cameron, Dr. J. C. Gillie, Dr. Carl E. Hill, Dr. R. W. Schnarr, Kitchener; Dr. D. S. Wigle.

The Mental Hygiene Institute of Montreal presented Dr. Clarence M. Hincks of Toronto with a \$1,000 award as the Canadian making the most outstanding contribution to mental health. Funds for the award to be given every three years were donated by an anonymous Montreal citizen. Dr. Hincks is the first recipient. As head of the Canadian Mental Health Association Dr. Hincks played a major rôle in improvement of mental health services.

At the 53rd graduation of nurses of the Toronto Western Hospital there were 54 graduates. Miss Gladys Sharpe, superintendent of nursing, outlined the changes necessary to adapt the school to the new two year course. The modified program, approved by the nurse registration division of the Department of Health last year, provides for all essential instruction and experience in the first 24 months, the final 12 months are considered an internship on a salary basis. This last year will include one month in a hospital in a rural area and two months in an elective service. This course was announced in July 1950; since then inquiries have been received from 797 interested persons, from which 90 have been accepted for the class entering in September 1951, and 44 are pending for the class of September 1952. The student nurse will have 44 hours a week including class time.

The Toronto Academy of Medicine has elected the following: Dr. James W. Ross, president; Dr. Stuart Gordon, vice-president; Dr. G. E. Wodehouse, honorary secretary, and Dr. Hagar Hetherington, honorary treasurer.

The American Association of Orthodontists awarded Dr. C. H. M. Williams and Dr. D. G. Watt of the Faculty of Dentistry, University of Toronto, a prize of \$500 for an essay based on extensive research, entitled "The Effects of the Physical Consistency of Food on the Growth and Development of the Mandible and Maxilla of the Rat". They fed one group of rats a highly refined diet and another group the same diet but in a much rougher form. The rats that had to chew their rations developed much healthier mandibles and maxillae.

Dr. L. O. Bradley, chairman of the National Outpost Advisory Committee of the Red Cross, stated at the annual meeting of the Red Cross Central Council that the 423 members of the Red Cross Outpost Hospital staffs gave assistance to more than 88,000 Canadians in 1950. Five new Outposts were opened during the year which brought the total number in Canada to 81. Outpost nurses assisted at 4,388 births and 7,038 operations during the year.

The Federal Department of Health has announced an \$18,000 grant to open another clinic in Montreal to help to diagnose and prevent glaucoma. The Glaucoma exhibit at the Ontario Medical Association was well done with coloured transparencies, photographs and charts under the auspices of the Department of Ophthalmology of University of Toronto.

Dr. Gerard Barbeau, director of psychological services at Mount Providence, Montreal, speaking at the annual meeting of the Canadian Welfare Council at Toronto said that adaptation of the mentally deficient to modern social life is one of the most serious problems of the

present time. Society will not give any special consideration to the mentally deficient with regard to employment but usually discriminates against them, so they must have special education. Their condition is constitutional, not a temporary curable condition. These people can make contributions as sheltered helpers, semi-skilled, unskilled, sheltered and custodial and institutional workers. Miss Ida Robb of the Lucy Morrison School for Girls, Hamilton, said that present day life was growing more difficult for any child, but for the mentally retarded the difficulty was very great.

Dr. John Hamilton has been appointed professor and head of the Department of Pathology at the University of Toronto, succeeding Dr. William Boyd who goes to the University of British Columbia. Dr. Hamilton is 41, he graduated from University of Toronto in 1935. He continued his work at Cambridge and Johns Hopkins. During the war he was with the R.C.A.M.C. in command of No. 1 Research Unit. In 1946 he joined the staff of McGill University and the following year he became professor of Pathology at Queen's University.

The Faculty of Medicine of the University of Toronto offers a Refresher Course in Eye Surgery from March 31 to April 4, 1952. The instruction will consist of lectures, operative clinics on patients and cadaver surgery in small groups. The guest surgeons will be Dr. Daniel B. Kirby, New York City and Mr. T. Keith Lyle, F.R.C.S., London, England. The staff of the Department of Ophthalmology in the University will contribute extensively to the course.

The course will be given for a minimum of 10 students and a maximum of 30 students. Applications should be made to the dean of the Faculty of Medicine, not later than January 15, 1952.

LILLIAN A. CHASE

Quebec

The Canadian Hospital Council have bestowed the George Findlay Stephens Memorial award on Dr. A. Lorne C. Gilday, of Montreal, for noteworthy service in the field of hospital administration. This award is in memory of one of the outstanding figures in hospital administration, the late Dr. George F. Stephens, who died in 1949. Previous recipients were Dr. A. K. Haywood, of Vancouver, in 1949, and the late Dr. F. W. Routley, of Toronto in 1950.

Dr. Gilday has a long and distinguished career. A graduate in medicine of McGill University before his 22nd birthday he served in the first Great War with the 1st Grenadier Guards, Canada, and later as Lieutenant-Colonel in command of the 13th Field Ambulance. He was mentioned in despatches and awarded the D.S.O., and later was wounded and repatriated to Canada.

His long period of service in the hospital field was as superintendent of the Western Hospital of Montreal (later the Western Division of the Montreal General Hospital). He served in this work from 1923 to 1950, as well as carrying on the general superintendency of the Montreal General Hospital for part of the second Great War, and his activities with the Montreal Hospital Council and later the Canadian Hospital Council were notable.

Dr. Gilday is a worthy recipient of a high honour.

Dr. S. A. MacDonald, lecturer in surgery at McGill University and a member of the staff of the Montreal General Hospital, and Dr. J. T. MacLean of the Royal Victoria Hospital, have been elected members of the American Association of Genito-Urinary Surgeons.

The Royal Victoria Hospital Campaign for \$7,000,000 is now well under way. Whilst it is too soon at time of going to press to give any final results, the outlook

is very encouraging. The medical staff has contributed a total of \$326,000 and a large sum has also been raised amongst the nursing staff.

It is only a year ago that the Joint Hospital Fund Campaign was completed with such outstanding success. The Committee of that Fund have made it clear that the present Royal Victoria Hospital Campaign is actually the second stage in the development of what is to be a great Montreal medical area, centred in the Medical Faculty of McGill University. This will include four teaching hospitals, the Royal Victoria being the fourth of the group.

De concert avec la Société d'Hygiène et de Médecine Préventive, l'Association Canadienne de Santé Publique a tenu sa trente-neuvième réunion annuelle à Montréal du 28 au 31 mai, sous la présidence conjointe du Dr G. D. W. Cameron, sous-ministre de la Santé et du Bien-Etre social et du Dr Marc Bergeron, directeur de l'Unité Sanitaire de St-Hyacinthe. A l'issue du Congrès, le Dr G. P. Jackson, du Ministère de la Santé de l'Ontario a été élu président de l'Association.

Les autorités de l'Hôpital de Maisonneuve (en voie de construction) ont décidé de consacrer un étage à la fondation d'un Institut de Cardiologie qui comprendra cinquante lits.

Le 3 juin, l'Hon. Maurice Duplessis, premier ministre de la province de Québec a posé la pierre angulaire du nouvel Hôpital Ste-Justine. Sur ce nouveau site, chemin de la Côte Ste-Catherine, s'élèvera un hôpital de 800 lits pour enfants, le plus important du genre du continent nord-américain.

Le ministère provincial a annoncé le don de deux octrois, le premier à l'Hôpital Laval de Québec au montant de \$100,000., et le second de \$750,000. pour l'érection d'un aile de 12 étages qui abritera tous les départements spécialisés de l'Hôtel-Dieu de Chicoutimi.

Le Dr Charles Nadeau a été nommé directeur du Service de Santé de la Ville de Verdun.

General

World Health Organization News. Japan, the German Federal Republic and Spain have been admitted to the World Health Organization by the Fourth World Health Assembly, in session at Geneva.

Voting was: for Japan, 54 to 0, with 6 abstentions; for Germany, 53 to 1 (Israel), with 6 abstentions; for Spain, 53 to 1 (Mexico), with 6 abstentions.

By a majority vote of 29 to 27 in a total vote of 56 delegations, a joint meeting of the Program Committee and the Committee on Administration, Finance and Legal Matters of the World Health Assembly, in session recently in Geneva, approved the W.H.O. Director-General's proposal that the effective working budget of W.H.O. for 1952 should be \$8,379,653.

The decision still has to go before a plenary session of the Assembly for ratification.

The figure was the highest of four budget proposals before the Joint Committee, the others being the proposal of the United Kingdom for \$6,692,982, the proposal of the W.H.O. Executive Board for \$7,677,782 and the proposal of Sweden for \$8,000,000.

Dr. E. A. McCusker (Canada) supported the Executive Board's proposal on the ground that it would permit substantial implementation of the Director-General's proposed program without imposing too heavy a burden on governments. His position was supported by a number of countries including The Nether-

lands, Ireland, Iceland, Uruguay, Liberia, the Union of South Africa and Italy, generally on the grounds that it represented a fair compromise.

Plastic Surgery Awards, 1951. The Foundation of the American Society of Plastic and Reconstructive Surgery offers Junior and Senior Awards for original contributions in Plastic Surgery. Junior Award—2 scholarships in Plastic Surgery of 6 and 3 months respectively. The contest is open to plastic surgeons in the specialty not longer than 5 years. Senior Award—for the best essay on "Mass Treatment of Burns in Atomic Warfare". The winning essays will appear in the program of the forthcoming annual meeting of the Society. Entries must be received by the Chairman not later than August 15, 1951: The Award Committee, c/o Jacques W. Maliniac, M.D., 11 East 68th Street, New York 21, N.Y.

Forthcoming Meetings

CANADA

College of Physicians and Surgeons of Saskatchewan, 44th Annual Meeting, Grant Hall Hotel, Moose Jaw, September 17 to 20, 1951.

Ontario Public Health Association, 2nd Annual Meeting, Royal York Hotel, Toronto, October 1-2, 1951.

Saskatchewan Hospital Association, Hotel Saskatchewan, Regina, Sask., October 11-12, 1951.

British Columbia Hospitals' Association, Hotel Vancouver, Vancouver, B.C., October 16 to 19, 1951.

Associated Hospitals of Manitoba, Winnipeg, Manitoba, October 24 to 26, 1951.

UNITED STATES

American Congress of Physical Medicine, 29th Annual Scientific and Clinical Session, Shirley-Savoy Hotel, Denver, Colorado, September 4 to 8, 1951.

Second International Gerontological Congress, Hotel Jefferson, St. Louis, Missouri, September 9 to 14, 1951.

American Hospital Association, St. Louis, Missouri, September 17 to 20, 1951.

OTHER COUNTRIES

The International Hospital Federation, Second Post-war Congress, Brussels, Belgium, July 15 to 21, 1951.

International Congress of Clinical Pathology, London, England, July 16 to 20, 1951.

International Poliomyelitis Congress, Copenhagen, Denmark, September 3 to 7, 1951.

Congress of Anaesthetists, joint session of the International Anaesthesia Research Society and the International College of Anaesthetists, 26th Annual Meeting, British Medical Association House, London, England, September 3 to 7, 1951.

The World Medical Association, 5th General Assembly, Stockholm, Sweden, September 15 to 20, 1951. (September 21—Meeting of the Medical Editors of the world, sponsored by the W.H.O.).

International Congress of Anesthesiology, Nursing School of the Salpêtrière, Paris, France, September 20 to 22, 1951.

International Association of Allergists, Zurich, Switzerland, September 23 to 29, 1951.

European Congress on Rheumatism, Barcelona, Spain, September 24 to 27, 1951.

International Society of Surgery (Société Internationale de Chirurgie), 14th Congress, Paris, France, September 24 to 29, 1951.

ABSTRACTS FROM CURRENT LITERATURE

Medicine

Clinical Observations on the Effects of Injectable Rutin, Esculin, Adrenoxyl, and Vitamin E on the Capillary Fragility of Diabetic Retinopathy. Levitan, B. A.: *Am. J. M. Sc.*, 947: 185, 1951.

The author points out that the retinopathy associated with diabetes mellitus has been resistant to all forms of therapy and that interest recently has centred on the vitamin P compounds which are thought to reduce the tendency to capillary bleeding. He refers to the fact that many of the factors affecting capillary fragility are unknown and that it is difficult to judge the status of the capillaries in general from the observations made on a limited number of blood vessels as tested in the forearm.

Of the four substances used in this study, the first three are vitamin P types of therapeutic agents; the fourth, vitamin E, was tried for its effect because of the protection it is considered to afford in experimental vascular degenerative changes in which fat is thought to be implicated.

In a study of ten experimental subjects, eight of whom had diabetes mellitus, one was in the nephrotic phase of glomerulonephritis and one had essential hypertension, the use of these four compounds failed to significantly affect capillary fragility. In five subjects vitamin E daily alone and in combination with large doses of ascorbic acid and rutin failed to bring about any lasting improvement in capillary strength.

G. A. COPPING

Treatment of Friedlander's Pneumonia. Gill, R. J.: *Am. J. M. Sc.*, 946: 5, 1951.

The author notes the marked improvement in the prognosis of Friedlander's pneumonia which has occurred since the introduction of the sulfonamides and streptomycin. He points out that the results from sulfonamides have varied from 13 to 84% mortality in different publications, indicating the need for caution in interpreting results. The cases upon which this study is based were 25 in number, an incidence among 2,000 cases of pneumonia of all kinds of 1.2%. They are divided into three types, the acute primary Friedlander's pneumonia, the acute mixed infections including Friedlander's and cases of chronic Friedlander's pneumonia. He points out that as has been the case in all the published series, the patients were predominantly middle-aged males.

A point of interest is that in those cases in whom recovery occurred the treatment was started an average of 2.9 days following the onset of symptoms, whereas in the cases that died the period of time prior to the institution of therapy averaged 4.1 days. The mortality rates of various series hitherto published for the era before the introduction of the antibiotics varied from 75 to 82%; the author's overall mortality rate was 40%. The patients in the series were treated with various combinations of the antibiotics. The five patients who received penicillin alone died. There is no certain reason advanced as to why penicillin failed to aid these patients unless it may be, as the author suggests, that the penicillin may kill off susceptible non-pathogens which have some useful antibiotic effect.

It is of interest that in a follow-up of the cases surviving, those who had cavities showed subsequent healing and there was no extensive progressive fibrosis with the exception of one patient who showed thickening of the pleura.

The importance of early bacteriological diagnosis in these cases is stressed and it is pointed out that the gross character of the sputum and the clinical and x-ray findings in the initial stages are not specific and the only available means for the early diagnosis of this disease is the examination of the sputum for the Friedlander's bacillus.

G. A. COPPING

Lumbar Sympathectomy for Arteriosclerosis of the Lower Extremities. Edwards, E. A. and Crane, C.: *New England J. Med.*, **244**: 191, 1951.

Medical therapy is disappointing in arteriosclerosis obliterans of the lower extremities. Sympatheticolytic drugs, such as priscoline, have little or no effect on the arteriosclerotic limb and may even render the ischæmia more profound by diverting blood to other areas of the body where the vessels are more capable of dilatation. Lumbar sympathectomy is the best method to date of improving the clinical condition of these patients.

Of 100 consecutive patients with symptomatic arteriosclerosis of the lower limbs subjected to lumbar sympathectomy there were two hospital deaths and six early thigh amputations while 92 left the hospital improved. The average follow-up period was twenty months during which time nine more patients died from various causes. The 89 patients now living have done well.

The only definite contra-indication to lumbar sympathectomy in these patients is necrosis down to bone proximal to the toes. A moderately unfavourable influence was exerted by diabetes and a lesser influence by other visceral disease and perhaps also by extreme hypertension. No influence upon results was evident from age, sex, level of occlusion of major arteries, degree of calcification of arteries on x-ray examination or failure to obtain a good temperature response in the limb from paravertebral or spinal anaesthesia.

Lumbar sympathectomy should be more widely employed in the treatment of symptomatic arteriosclerosis of the lower extremities. NORMAN S. SKINNER

The Effect of Pneumoperitoneum on the Electrocardiogram. Pollak, A.: *Dis. of Chest*, **19**: 36, 1951.

The author studied the standard electrocardiogram on twenty patients with pneumoperitoneum. In the recumbent position nearly all showed normal tracings without axis deviation. The unipolar lead electrocardiogram presented a variety of patterns nearly all of which were within normal limits. When the standard lead electrocardiogram was taken with the patients sitting down the majority showed a left axis deviation similar to left ventricular preponderance. A similar majority showed a change to a horizontal position of the heart by the unipolar lead electrocardiogram. In the normal individual rising from the recumbent to a sitting position axis changes are neither consistent nor striking. In patients with pneumoperitoneum a change from the recumbent to the sitting position the diaphragm must rise. The converse occurs in normal individuals. There is also an associated counter-clockwise rotation around the long axis of the heart looking at the apex.

Further investigation showed that descent of the left hemidiaphragm caused this rotation, whereas recumbency or immobility of the diaphragm caused no apparent electrocardiographic changes. No gross difference was noted in the results with the standard lead and unipolar electrocardiogram i.e., in these cases "left axis shift" of standard leads and "horizontal shift" of the unipolar leads are evidence of counterclockwise rotation of the heart rather than elevation of the apex.

In the recumbent position deep inspiration had no effect on the electrocardiogram in patients who had not received a phrenic crush. There were some inconsistent and paradoxical changes in those who had had left phrenic crush. Hence one must carefully interpret the electrocardiogram test in these patients.

J. A. STEWART DORRANCE

Fingerprint Detection and Mercury Poisoning. Blench, T. H. and Brindle, H.: *Lancet*, **1**: 378, 1951.

The authors review the literature and present two cases of mercury poisoning in police officers using "dusting" powder or gray powder (hydrarg. cum crete) in the investigation of fingerprints. The main manifestations of chronic mercurial poisoning—erethism, tremor, and stomatitis—are difficult to distinguish from conditions which may arise in people having no proved contact with mercury. The bulk of mercury is probably

absorbed via the skin or is ingested in the food from the hands. The amount of mercury ingested and excreted may bear little relationship to the total amount of exposure to the powder. Much depends upon the technique of using the "dusting" powder, cleaning the hands and clothes.

Two police officers with nine and twelve years' experience in "dusting" fingerprints submitted 24-hour urine specimens in a study lasting four months. Specimens of handwriting and free line drawing were without fault. Blood studies were within normal limits and no basophilic stippling was noted. For a period of seven weeks no extra precautions during "dusting" were taken, the average 24 hour excretion was 152-425 µg. mercury. After wearing overalls during the actual "dusting" and scrupulously washing their hands for one week the daily excretion of mercury was 41-89 µg. Studies of 14 controls with no known contact with mercury or its products showed an excretion of 5-90 µg mercury per day, averaging 31.5 µg. The two police officers examined in this study had been responsible for all the fingerprint detection in the city of Manchester, and had used gray powder for many years. They showed no clinical signs of chronic mercury poisoning. Yet with simple precautions their excretion of mercury was markedly reduced. From this study there is evidence that care should be used in prolonged use of mercury products as in the manufacture of thermometers and drugs to prevent idiosyncrasies and severe chronic poisoning. J. A. STEWART DORRANCE

Surgery

Reflex of the Intestinal Chyle in the Lymphatics of the Leg. Sewelle, M. M. and Deysson: *Ann. Surg.*, **133**: 234, 1951.

During the study of 50 cases of elephantiasis by venography, lymphography and lymphatic tapping, 5 cases of reflex of intestinal chyle into the lymphatics of the leg were observed. The analyses of these lacteal fluids are tabulated and the case histories given. The authors do a "total superficial lymphangiectomy" in suitable cases and emphasize that the gland of Cloquet must be removed and deformities of the veins corrected.

BURNS PLEWES

Obstetrics and Gynæcology

Prolonged Labour. Winterringer, J. R.: *Am. J. Obst. & Gynec.*, **61**: 622, 1951.

This is an analysis of 211 cases of prolonged labour, an incidence of 2.1% in 10,042 deliveries. One maternal death occurred, secondary to pre-eclampsia. The three principal causes of prolonged labour were primary uterine inertia, cephalopelvic disproportion and positional dystocia. The highest incidence of prolonged labour was in primigravidas. In multigravidas excessive size of the fetus may be the cause of cephalopelvic disproportion. Rupture of the membranes seemed to hasten labour in some cases. Prolongation of the second stage did not seem to affect the fetal mortality.

The use of pitocin, with proper precautions, in cases of primary uterine inertia was found to hasten labour and to reduce the number of midforceps deliveries. Fetal mortality was not increased and uterine rupture did not occur. The most efficacious method for administering pitocin is by intravenous drip. The prophylactic use of antibiotics, the intravenous administration of fluids, and the use of morphine to promote rest are indicated.

Roentgen-ray pelvimetry has been used too infrequently and its increased use, especially in conjunction with pelvic examinations during labour to exclude contracted pelvis and positional disproportion, is indicated. The increased use of earlier Cæsarean section is probably indicated when borderline cephalopelvic disproportion exists and labour is of the inertial type.

The high incidence of maternal morbidity and fetal mortality in labours of more than fifty hours indicates that labour should be effected by the most appropriate means, at least by that time. ROSS MITCHELL

Fetal Mortality in Cæsarean Section. Landesman, R.: *Am. J. Obst. & Gynec.*, 61: 557, 1951.

Notwithstanding progressive reductions during the past decade, fetal mortality in Cæsarean section has continued to be 2.5 times higher than in the clinic material. This relatively high fetal mortality is related to the indication for the operation rather than to the procedure itself. Premature separation accounts for 40% of the infant deaths, the vast majority being deadborn. The fetal loss is 50% in sections performed for maternal safety; e.g., in premature separation of the placenta and rupture of the uterus.

During recent years there has been considerable improvement in fetal mortality following sections for prolonged labour, placenta prævia and toxæmia; this is related directly to a reduction in puerperal infection and improved care of premature infants. A section for cephalopelvic disproportion is of no more risk to the infant than spontaneous vertex delivery. The risk to the infant is greater for operation because of previous section than in the disproportion group. This is related to miscalculation of the gestation period, general anaesthesia and rupture of the uterus.

Further reduction in fetal mortality associated with Cæsarean section may be possible by complying with the following suggestions; (a) local anaesthesia, particularly with premature infant, (b) high concentrations of oxygen during and after section, (c) readily available paediatric premature nursery.

ROSS MITCHELL

Oxygen Saturation of the Blood of the Newborn as Affected by Maternal Anaesthetic Agents. Taylor, E. S., Govan, C. D. and Scott, W. C.: *Am. J. Obst. & Gynec.*, 61: 840, 1951.

The careful administration of ether, cyclopropane, nitrous oxide, or pentothal sodium for periods no longer than 10 to 12 minutes at the termination of the second stage of labour led to no statistically significant differences in average of oxygen saturations to the infant's blood at birth born after pudendal or saddle block anaesthesia. However, a significantly higher percentage of the infants reached saturations above 90% at one hour when regional anaesthesia was used than when the general anaesthetics were used. Furthermore, no infants required resuscitation after regional anaesthesia as compared with from 10 to 60% following the various general anaesthetics.

Since maternal general anaesthesia, given for relatively short periods at the termination of the second stage of labour, tends to prevent the early attainment of normal blood oxygen saturation levels in a significant proportion of newborn infants, prolonged general anaesthesia for delivery should be avoided. Some form of regional anaesthesia should be used for deliveries that are complicated by prematurity, placenta prævia, obstetrical trauma, placental separation, toxæmia of pregnancy or compression of the umbilical cord, since these infants are already candidates for anoxia.

ROSS MITCHELL

An Evaluation of Cæsarean Section Infant Mortality. Huber, C. P.: *Am. J. Obst. & Gynec.*, 61: 895, 1951.

Cæsarean section when performed under proper conditions is a safe operation in that the maternal mortality should approach zero, but infant mortality is greater than that following vaginal delivery. Repeat Cæsarean section does not increase the risk for either mother or infant.

The premature infant has less chance of survival following Cæsarean section than after vaginal delivery.

Careful evaluation of previous experience does not justify increasing the incidence of Cæsarean section.

Pædiatrics

Determination of Sodium²⁴ "Space" in Infants, Children and Adults. Perley, A., Forbes, G. B. and Pennoyer, M. M.: *J. Pediat.*, 38: 299, 1951.

The sodium "space" was determined in 67 healthy children and adults using the chloride salt of radioactive Na²⁴ (half-life 14.8 hours). The Na²⁴ was given in

1.0 ml. doses, intravenously in quantities of 1.0 to 1.5 microcuries per kgm. body weight computed to deliver a dose of 0.11 to 0.17 r. Venous blood was withdrawn at three hour intervals and the activity was measured with a Geiger counter. The period allowed for distribution and stabilization of Na²⁴ was one and one-quarter to four and one-half hours. The findings indicate that the sodium "space" is much higher in young infants than in older children or adults. The average "space" in premature infants was 43.5% of total body weight, and 35.3% of newborn full-term infants. The values for children one to fourteen years old averaged 30.2% and those of adults 25.2%. Hence the volume of fluid occupied by sodium relative to body weight declines as growth proceeds. Thiocyanate "spaces" may also be determined by this method. J. A. STEWART DORRANCE

Illness in the First Trimester of Pregnancy, etc. Hartmann, E. J. and Kennedy, R. L. J.: *J. Pediat.*, 38: 306, 1951.

In a study of 1,228 mothers who gave birth to 1,237 infants there were 65 anomalies observed (5.3%). Account was taken of the maternal health during the first trimester. There was 12% incidence of sickness—of this 50% gastro-intestinal upset, 28.6% urinary tract infection and 12.5% "flu". Anomalies occurred in 5.2% of infants born whose mothers had had no illness and in 5.4% where illness had occurred in the first three months. The highest incidence of congenital anomalies occurred where there had been maternal illness in the second month. Further study indicated that illness during the first trimester made no appreciable difference in the incidence of full-term pregnancy, prematurity, or stillbirth.

J. A. STEWART DORRANCE

An Evaluation of Carbohydrate—Phosphoric Acid Solution in the Management of Vomiting. Bradley, E. J., Proutt, L., Shipley, E. R. and Oster, R. H.: *J. Pediat.*, 38: 41, 1951.

Based on the findings of glycosuria and prolonged elevation of blood glucose following the administration of glucose solutions in the treatment of vomiting, the authors administered a buffered phosphoric acid solution with invert sugars to 246 cases of epidemic vomiting and regurgitation. Also previous investigation had shown that phosphate groups had caused a sustained reduction in contraction rate and amplitude yet without the loss of tone in gastro-intestinal muscle, and that phosphate was necessary for carbohydrate metabolism. In 172 cases of epidemic vomiting 100% relief was obtained, regurgitation by infants was stopped in 67%, toxic vomiting was controlled in 88%, and motion sickness in 100% of cases using 5 ml. doses one-half hour before feeding. The vomiting of pyloric stenosis and that due to other intestinal obstruction was not controlled. The use of this solution does not eliminate the need for correcting improper feeding habits.

J. A. STEWART DORRANCE

Later Status of Juvenile Diabetics. Daeshner, C. W., Deisher, R. W. and Harlmann, A. F.: *J. Pediat.*, 38: 8, 1951.

Between 1922 and 1943 of 120 cases of juvenile diabetes mellitus, 30 are dead, 40% dying from acidosis and the remainder from various causes. The age of onset of diabetes mellitus was from six months to fourteen years. The age at the time of study was ten to forty years. The criteria to assess control status were: nutrition, occurrence of acidosis, hypoglycæmia, infections, glycosuria, renal complications, blood pressure, and capillary fragility. The incidence and severity of vascular complications increased as the duration of the diabetes mellitus increased. The control of glycosuria by the patient paralleled his co-operation in the control of his own condition. Minimal retinal disease occurred in 25% of the series, and 16% had advanced retinal disease.

Of interest is the fact that no patient with diabetes mellitus of less than fifteen years' duration had advanced retinal disease. Capillary fragility was normal in 53% of the cases studied and 90% of those with increased capillary fragility also had retinopathy. Only 17% had definite nephritis and of this 6% were unable to concentrate and had elevated blood non-protein nitrogen. Blood pressure was above normal values in two-thirds of those with nephritis. All cases of elevated blood pressure occurred in those who had poor control. Over 50% of those with elevated blood pressure were in the twenty to twenty-eight year duration group.

No correlation was given regarding the incidence of similar conditions in normal population groups. The objective of a satisfactory regimen for the management of juvenile diabetes is the best possible control that may be obtained with parent and patient education along with a minimal hospitalization and anticipation of normal growth, development, education and play.

J. A. STEWART DORRANCE

Ineffectiveness of Aureomycin in Preventing the Primary Vaccinia Reaction. High, R. H. and Reiner, C. B.: *J. Pediat.*, 38: 60, 1951.

It is well known that aureomycin controls infections caused by some rickettsia and large viruses. It was suggested that it might prevent the "take" of vaccination when used to treat a concomitant infection. The authors vaccinated a group of 29 infants: sixteen were treated concurrently with aureomycin 50 mgm./kgm. body weight by mouth in divided doses for five days, the remainder served as a control group. The size and characteristics of the reactions in every infant of both groups were typical of primary vaccination on the third and seventh days. No infant in either group showed a marked elevation of temperature. The concurrent administration of aureomycin does not affect the evolution of the primary vaccinia reaction, hence there is no basis for its use in eczema vaccinatum or secondary vaccination and its use should not be withheld for the treatment of a concomitant infection.

J. A. STEWART DORRANCE

The Significance of Delayed Development in the Diagnosis of Cerebral Palsy. Denhoff, E. and Holden, R. H.: *J. Pediat.*, 38: 452, 1951.

One hundred children with cerebral palsy were studied for the rate and time of development of signs of cerebral palsy. The authors determined the normal and abnormal neurological status of infants and young children by the standards of Amatruda and Gesell.

The normal infant is able to lift his head up from prone for short periods during the first month. If there is no head lifting after three months, cerebral palsy should be considered. Usually the normal infant reaches for nearby articles at three or five months. In the studies 86% of the infants reached for objects later than five months of age. By the age of six to eight months the normal infant sits without support. If an infant cannot sit alone by ten months an abnormal condition is present. Crawling, by dragging the body along the floor and drawing the legs after, normally occurs by seven months, if this is delayed beyond eight months cerebral palsy must be considered. At the age of nine months the infant can promptly grasp an object between thumb and forefinger, a delay beyond eleven months indicates retarded development. Single words are spoken at nine to eleven months; lack of this is abnormal after twelve months. In the patients studied this did not occur until 27 months of age. An infant will stand alone normally by twelve months, the late normal is thirteen months. Walking alone occurs at twelve to fifteen months with a limit of eighteen months. Two or three-word sentences are formed by 24 months, delayed speech is considered if this does not occur by 30 months. In cerebral palsy in infants and young children these criteria of development are delayed to two to four times the normal time and the intelligence is the least affected.

J. A. STEWART DORRANCE

The Healthy Child: Its Many Disguises. Gordon, I.: *Brit. M. J.*, 1: 611, 1951.

One of the most difficult problems in the medical conduct of child welfare centres and school health inspectors is to decide what is normal and what is abnormal. The general practitioner is not primarily at fault; it is his education, as most of his teachers have not had great experience of the "normal" and do not give this problem the attention it warrants. The literature on intelligence quotients is vast and anthropological data are numerous. These conditions may be assembled into a heterogeneous collection of four groups: conditions essentially normal, but deviating from a theoretical ideal of perfection; borderline states; definitely pathological conditions; frank misdiagnoses.

Five conditions are very important with regard to the public and private money spent unnecessarily on their treatment, or by the effects on the later career of the individual: (1) enlarged tonsils—only when so enlarged as to cause dysphagia should they be removed. (2) Orthopaedic defects; "a very casual observation of the posture of normal children will refute the suggestion that the legs should be straight". True flat foot in early childhood rarely occurs. (3) Phimosis should not be treated by surgery until a satisfactory attempt by manual retraction has failed. (4) Constipation in breast-fed babies is to be expected, as there are infrequent stools until supplementary or artificial-feeding is started. (5) Innocuous cardiac murmurs, particularly systolic murmurs and unnecessary attention leads to a neurosis. Other conditions of the skin; naevi, sunburn, physiological jaundice; nervous system; mucous membranes; there is little relationship between the colour of the mucosa and hæmoglobin values; eyes; blue sclerotics in infancy rarely means fragilitas ossium; urinary system; red stains on the diapers occurs in summer—heat urine concentration, ears; pinnae protrude normally in the first year, and genitalia: the maldescended testis may be normally withdrawn by the cremasteric muscle in cool weather.

There are many more normal malformations of children which disappear with maturation and one must exert great care in making a diagnosis. Interpretation of these universal imperfections is a difficult task and should be done by a doctor rather than by teachers or nurses. It should always be kept in mind that normal developmental conditions in the child may be pathological in the adult and vice-versa.

J. A. STEWART DORRANCE

Acute Glomerulonephritis: Impetigo as an Etiological Factor. McCullough, G. C., Coffee, J. Y., Trice, P. A., Stone, J. J. and Crandall, H. L.: *J. Pediat.*, 38: 346, 1951.

The authors studied the etiology of 124 cases of acute glomerulonephritis among children. The average age being six and a half years, and the antecedent infections were: impetigo (34%), acute tonsillitis (31%), upper respiratory infection (11%), and the balance, including pneumonia (5%) and scarlatina (3%), completed the causes. The average hospital admission was for nineteen and one-half days—including two deaths or 1.6%. The average duration of illness before hospitalization was eighteen and one-half days. Invariably the preceding symptom was "swelling", bloody urine was reported in only two cases. In all cases there were albumin and red blood cells in the urine. Biochemistry showed non-protein nitrogen elevation (40%) above 35 mgm. %. Blood sedimentation rates were elevated in 96% of cases. Hyperpiasis was present in 96% of cases. The high incidence of skin infections reflects that within the past decade acute pharyngitis and otitis have been treated with penicillin and the sulfonamides and have prevented sequelæ. Many skin infections may go untreated as of minor importance. It is suggested that if equal attention were to be paid to the treatment of acute upper respiratory infections and skin infections—impetigo—there would be a much lower incidence of acute glomerulonephritis.

J. A. STEWART DORRANCE

Psychiatry

Delirium: A Gap in Psychiatric Teaching. Levin, M.: *Am. J. Psychiat.*, 107: 689, 1951.

The author describes this paper as "a plea to stop looking upon delirium as something esoteric". He believes that delirium is probably still the commonest of all major psychoses. It occurs in association with infections and hence appears frequently in general hospitals. Every delirious patient is disoriented. In addition he is apt to be dull, sluggish, restless, inattentive, fearful, excited and disturbed by nightmare-like fancies and hallucinations. It is important to note that the symptoms may shift rapidly and may even go away for a time, so that lucid intervals are common. In many cases the symptoms are worse at night, and sleep is disturbed. Delirium may set in suddenly or gradually. It is often, but not always, due to toxæmia, clearing up when the toxæmia has been corrected. It may also occur as the terminal event in the course of an organic dementia, even when there has been no toxæmia, and in such cases may go on for months and years and is irreversible. Fear is less pronounced in this type. The author makes the significant comment that with progressive growth of our ability to ward off and cure intercurrent infections, we may expect to see more and more cases of senile delirium.

The idea that the abrupt withdrawal of drugs and especially of alcohol favours the onset of delirium should be discarded. In drug delirium, it is advisable to discontinue the causative drug abruptly and completely. It is also unwise to use in treatment any drug that itself can cause delirium. The author believes that the use of bromides and barbiturates in delirium tremens is foolhardy and that paraldehyde is the only hypnotic to use in such cases.

F. W. HANLEY

Industrial Medicine

Physicians and Phosphate Insecticides. *New York State Med.*, 50: 1567, 1950.

During the last war, it was discovered by the Germans that some of the gases they were investigating in their intense search for lethal war gases, were more effective as insecticides. Information re such gases as tetraethyl pyrophosphate (TEPP), hexaethyl tetraphosphate (HETP) and o,o-diethyl o, p-nitrophenyl thiophosphate (Parathion) was uncovered by British and American teams occupying Germany at the close of the war. In this editorial some pertinent information re these phosphate insecticides, particularly parathion, is outlined for the medical profession. Of these insecticides which have proved of major importance to agriculture, parathion has been the one most extensively developed in the U.S. It is now being used in various preparations by farmers, florists and commercial spray operators. During 1949 large quantities were applied for insect and mite control. There were 3 fatalities and an unknown number of poisonings. All of the fatal cases had followed inhalation of parathion wettable powder or spray mist, and extensive skin contact.

The symptoms of poisoning are given together with details of treatment. The editorial stresses the responsibility of the medical profession to agricultural personnel who are using these phosphate insecticides. In areas where large-scale use of them is prevalent, physicians should be on the alert for persons who give a history of vertigo followed in 2 to 8 hours by nausea, abdominal cramps, vomiting, diarrhoea, muscular twitching, pressure in the chest, convulsions, coma, or pulmonary oedema. They may be severely poisoned and prompt attention is necessary. Furthermore any persons who exhibit toxic symptoms from exposure should be warned against further exposure until laboratory tests show that the cholinesterase of the blood has returned to normal.

MARGARET H. WILTON

Rehabilitation: The Third Phase of Medicine, Rusk, H. A.: *Arch. Indust. Hyg. & Occup. Med.*, 1: 411, 1950.

That the responsibility of the compensation physician relative to his patient cannot end when the acute illness is ended or the surgical correction completed, is stressed in this article. It ends only when the doctor has seen that the patient has been properly referred to those agencies and institutions which are equipped to rehabilitate and retrain the person suffering with a residual physical disability. To this end rehabilitation must be considered an integral part of medical service.

The author indicates the advances made in rehabilitation during and following World War II. Previous to the advent of the war, medical care, psychologic guidance and vocational rehabilitation were too frequently considered as separate and distinct processes. It has now been demonstrated by the successful programs of military and veterans' hospitals, that they are interdependent and inseparable. The results in these institutions have been most encouraging, and the increase in employment potentials is important from the economic aspect.

According to the National Health Survey conducted by the United States Public Health Service in 1935-36, there were at that time some 23,000,000 persons in the United States handicapped to some extent. It now seems logical to conclude that a program for the civilian chronically ill, similar to that in the military hospitals would bring comparable results. The first comprehensive total medical rehabilitation program in any community hospital in the United States has been inaugurated recently at Bellevue Hospital in New York. It is under the professional direction of the Department of Rehabilitation and Physical Medicine of the New York University College of Medicine and operates as a department affording service to other departments of the hospital in much the same manner as the roentgenology division and laboratory.

After medical care is completed most physically handicapped persons must be retrained in skills necessary for carrying on activities inherent in daily living and common to all types of work. They must be retrained to walk and travel, to care for daily needs, to communicate orally or in writing, and to use normal methods of transportation.

The author stresses also the importance of sufficient trained personnel as essential to the successful operation of a medical rehabilitation program. This is now recognized by a number of medical schools. At New York University a department of rehabilitation and physical medicine has been in existence as a major department for over a year and a half.

MARGARET H. WILTON

The International Hæmophilia Society was formed in 1942. Its object is to assist hæmophiliacs generally and in various ways to promote the study of hæmophilia. The Society depends on voluntary subscriptions and would welcome contributions, as well as correspondence with those interested in its work. The address is: The Galton Laboratory, University College, Gower Street, London, W.C.1, England.

What I want to make clear is that to handle disease, or to handle the patient on the physical plane alone is to deal with only the half. The cure of the sick sometimes depends on kindness more than efficiency. The patient is sick—he wants his symptoms relieved. He wants comfort. He hopes for cure. He may think you have given him cure, but at least you have given him something of yourself if you are a good doctor.—Lord Alfred Webb-Johnson.—*Review of Gastroenterology*, 17: 337, 1950.

on call



published in the interest of community medical service

WHY GRIEVANCE COMMITTEES?

An experiment in medical public relations which has proved successful in many areas in the United States, will soon be tried out in Canada for the first time. The council of the Ontario Medical Association, voting on a report of the committee on inter-relations and medical economics, has decided to set up grievance committees to hear complaints from the public about medical care. The decision was announced in May at the O.M.A.'s annual meeting in Toronto. Ontario's action may mean that other Divisions will set up similar committees.

In a C.B.C. national broadcast, Dr. Kirk Lyon, Leamington, past president of the Ontario Division, was asked why doctors believed grievance committees were necessary. "Medical practice is changing," he said. "A few years ago most patients knew their doctors well—and most doctors had an intimate knowledge of their patients. Now, as our cities grow larger, and we have more specialists and doctors who practice in groups, that relationship is no longer always so close." This lack, he said, sometimes led to misunderstandings which, in turn, caused grievances, real or fancied. "We hope the committees will help to re-establish, where it has been lost, that close relationship between doctors and their patients."

Local Committees. The O.M.A. has recommended committees on three levels.

1. A committee in each local medical society, with members appointed by the executive. Members would serve for three years, with one-third retiring each year. Local societies too small to warrant a committee could ask the nearest large society to handle their problems, with a representative of the smaller society present.

O.M.A. believes that most complaints can be cleared up quickly on the local level by doctors who know local conditions and people. "We believe we can solve most problems simply by airing them," says Dr. Miln C. Harvey, Kitchener, president of O.M.A. "The majority of grievances will be based on misunderstandings rather than on breaches of ethics by doctors or deliberate trouble-making by patients."

The local committees will serve another purpose, says Dr. Harvey. They will be a mirror, in part, at least, of public opinion, about the medical profession. They can also protect the doctor from malicious gossip. Committees in the United States, for instance, have been able to stop damaging rumours about individual doctors by asking rumour-mongers to

state their complaints formally.

Two Higher Committees. (2) A central committee of the O.M.A. will be set up to hear complaints that cannot be settled on a local level, but Association officials expect that few cases will require referral.

3. The necessity for a third level in the committee structure requires explanation to the public. Most people believe that medical associations—C.M.A., provincial divisions and local medical societies—have disciplinary powers, that they have tremendous power over the actions of the individual doctor. This belief persists and gives rise to the sort of talk one sometimes hears from otherwise well-informed people about doctors running a "closed corporation" or a "trade union". In his broadcast, Dr. Lyon explained that neither the O.M.A. nor any local society has any disciplinary powers. "They can of course, remove a doctor from membership in a society but that does not prevent him from practising medicine. Where a doctor is at fault we can only appeal to him on behalf of all his brother doctors." To handle only the rare cases that are expected to require disciplinary measures, O.M.A. will form a joint committee with the Ontario College of Physicians and Surgeons. The College could be the final authority on a difficult problem.

Some Ideas. Working on local committees will not be easy. Members will need time, tact and a good sense of public relations to ensure that the committees are doing their intended job.

The public, for instance, must not be given the idea that the committees have been formed as "whitewashing" devices, that they exist only to give soft answers to wrath. It is true that many of the complaints will be only in the minds of the patients but these must be given the same serious attention that a legitimate complaint warrants. For obvious reasons, those with complaints should be asked to make them in writing.

Much of the success of the committees will depend on the quick and efficient handling of complaints. Medical public relations would suffer badly should complaints be bottled up in the committee for any length of time without their originators hearing a progress report, at least, on them. We would suggest that committees meet often and deal quickly with a few complaints, rather than let them pile up.

The public will naturally be interested in the work of committees. It might be a good idea, at the end of the first year, for committees to prepare a report on their activities which could be issued to the press. Such a report could outline cases heard, omitting names, and give their disposition.

Work Two Ways. We mentioned earlier the rôle of the committees in stopping rumours. There is another important part they can play in improving relations between doctors and pa-

tients. Since they are willing to receive complaints, the committees should have a perfect right to make complaints—about the public. Such problems as unnecessary late calls, unrealistic attitudes by patients towards the value of medical services, the need for patients to realize that doctors cannot always drop urgent prior commitments to attend immediately to them, can be brought to the public's attention by committees.

Answers to Some Questions. "It's a poor idea. We'll have every crank and maniac in town on our necks." That's the opinion of at least one doctor. In part, he's right. The committees will undoubtedly attract the cranks and trouble-makers. But doctors already deal with these people—and alone. The grievance committees will provide a safety valve to protect the individual doctor. Nor must the part of cranks in affecting public opinion be ignored. If doctors can win their goodwill by treating their fancied complaints honestly and sympathetically, their time will have been well spent in many cases.

"Why should doctors, only, set up grievance committees? Service station operators, for instance, don't have them, nor do carpenters. And certainly they come in for their share of complaints."

The difference is profound. Medicine is a pro-

fession. Carpentry and selling gas are not. The public can register their complaints against tradesmen by ceasing to do business with them. Unless doctors wish to become tradesmen, they must provide some machinery for the public to make complaints, other than to "shop around" for a new doctor. Nor can the business of selling merchandise or craftsmanship be compared to the profession of attending the sick. The one is controlled by competition; the other is done by doctors in trust for the public—and the public should have the right to complain about medical service if it wishes.

"But lawyers are professional men and they have no formal grievance machinery for the public." There are many Canadians who believe that, rather than the profession, the state should run our medical services. Perhaps because the work of lawyers does not touch so directly the life of every citizen, there is no such feeling about law at present. In the United Kingdom, under a government-run medical service, public hearings, reports of which are published in the press, are held when patients have grievances. It could come to that in Canada. Only by offering a better alternative to Canadians can the medical profession in this country avoid the threat of a government-run medical service. Grievance committees are a necessary part of that alternative.

en devoir



Publié par l'Association médicale canadienne dans l'intérêt des
soins médicaux en commun

POURQUOI DES COMITES DE GRIEF?

Une expérience en regard des relations publiques avec la profession médicale, a obtenu un tel succès dans plusieurs régions des Etats-Unis, qu'elle sera bientôt essayée au Canada pour la première fois. Le conseil de l'Association Médicale de l'Ontario, votant sur un rapport du comité concernant les relations mutuelles et l'économie médicale, a décidé d'établir des comités de grief pour recevoir les plaintes du public au sujet des soins médicaux. La décision fut annoncée lors de la réunion annuelle de l'Association Médicale de l'Ontario, qui eut lieu à Toronto au mois de mai. L'action de l'Ontario pourrait donner lieu à semblables comités.

Au cours d'une causerie prononcées sur le réseau radiophonique national de la CBC, le Dr Kirk Lyon de Leamington, ancien président de la division de l'Ontario, répondit pourquoi les médecins croyaient que les comités de grief étaient nécessaires. "La pratique de la médecine change", dit-il. "Il y a quelques années, la plupart des patients connaissaient très bien leur médecin—et plusieurs médecins possédaient une connais-

sance intime de leurs patients. De nos jours, alors que les villes sont plus peuplées, nous voyons plus fréquemment des spécialistes et des médecins exerçant leur profession en groupes, ce qui diminue l'intimité des relations entre les médecins et leurs patients." Cette situation défavorable, ajouta-t-il, peut conduire parfois à des mésententes qui, en retour, causent des griefs, fondés ou injustifiés. "Nous espérons que les comités aideront à ré-établir où nous l'avons perdu, l'étroite relation qui doit exister entre les médecins et leurs patients."

Comités Locaux. L'Association Médicale de l'Ontario a recommandé des comités sur trois échelles.

1. Un comité dans chaque société médicale locale, dont les membres sont nommés par l'exécutif. Les membres doivent servir pendant trois ans, avec un tiers remplacé chaque année. Les sociétés locales trop petites pour posséder un tel comité peuvent demander à une société plus considérable de s'occuper de leurs problèmes, et nommeront un représentant qui sera présent.

L'Association Médicale de l'Ontario croit que la plupart des plaintes peuvent être réglées rapidement sur les lieux par des médecins qui connaissent les conditions et les gens qui appartiennent à ce milieu. "Nous croyons pouvoir régler la plupart des problèmes en les mettant à jour," dit le Dr Miln C. Harvey de Kitchener, président de l'AMO. "La majorité des griefs

seront basés sur les mésententes plutôt que sur les infractions du devoir par les médecins, ou sur une mauvaise volonté délibérée de la part des patients."

Les comités locaux serviront un autre but, dit le Dr Harvey. Ils seront des miroirs, pour ainsi dire, de l'opinion publique au sujet de la profession médicale. Ils protégeront aussi le médecin contre les médisances malicieuses. Des comités aux Etats-Unis, comme exemple, ont réussi à faire cesser des rumeurs nuisibles envers certains médecins, en demandant à ceux qui fomentaient ces rumeurs de présenter leurs plaintes d'une façon officielle.

Deux Comités Supérieurs. (2) Un comité central de l'Association Médicale de l'Ontario fut organisé pour régler les griefs qui ne peuvent pas être réglés localement, mais les officiels de l'association s'attendent à de rares cas qui nécessiteront un renvoi à ce comité.

3. La nécessité d'un autre comité dans cette organisation exige d'être expliquée au public. La plupart des gens croient que les associations médicales—CMA, Divisions Provinciales, et sociétés médicales locales—possèdent des pouvoirs disciplinaires et un pouvoir considérable sur les actes de chaque médecin. Cette croyance persiste et donne lieu à cette opinion fausse que nous entendons parfois de gens pourtant bien informés: que les médecins possèdent une "corporation fermée" ou "une union syndicale". Au cours de sa causerie à la radio, le Dr Lyon expliqua que la OMA ou toutes les sociétés locales ne possèdent aucun pouvoir disciplinaire. "Elles peuvent évidemment expulser un médecin de la société, mais ce geste ne l'empêche pas d'exercer la médecine. Lorsqu'un médecin fait une infraction, nous pouvons simplement intercéder auprès de lui au nom de tous ses confrères médecins." Seulement dans des cas très rares où sont nécessaires des mesures disciplinaires, la OMA formera un comité conjoint avec le Collège des Médecins & Chirurgiens de la Province d'Ontario. Le Collège peut alors être l'autorité qui donnera la décision finale sur les problèmes difficiles.

Quelques Idées. Il ne sera pas facile de siéger dans des comités locaux. Les membres auront besoin de temps, de tact et d'une bonne connaissance des relations publiques pour être sûrs que les comités font le travail auquel ils sont destinés.

Le public, par exemple, ne doit pas avoir l'idée que les comités sont fondés comme "pour sauver l'apparence" et qu'ils existent pour apaiser les colères par des mots doux. Il est vrai qu'un grand nombre de plaintes dépendront seulement de l'esprit des patients, mais celles-ci doivent recevoir la même considération sérieuse que les griefs justifiables. Pour des raisons évidentes, les plaintes devront être soumises par écrit.

Le succès des comités dépendra en grande partie sur la façon rapide et efficace de répondre aux griefs. Les relations avec la profession médi-

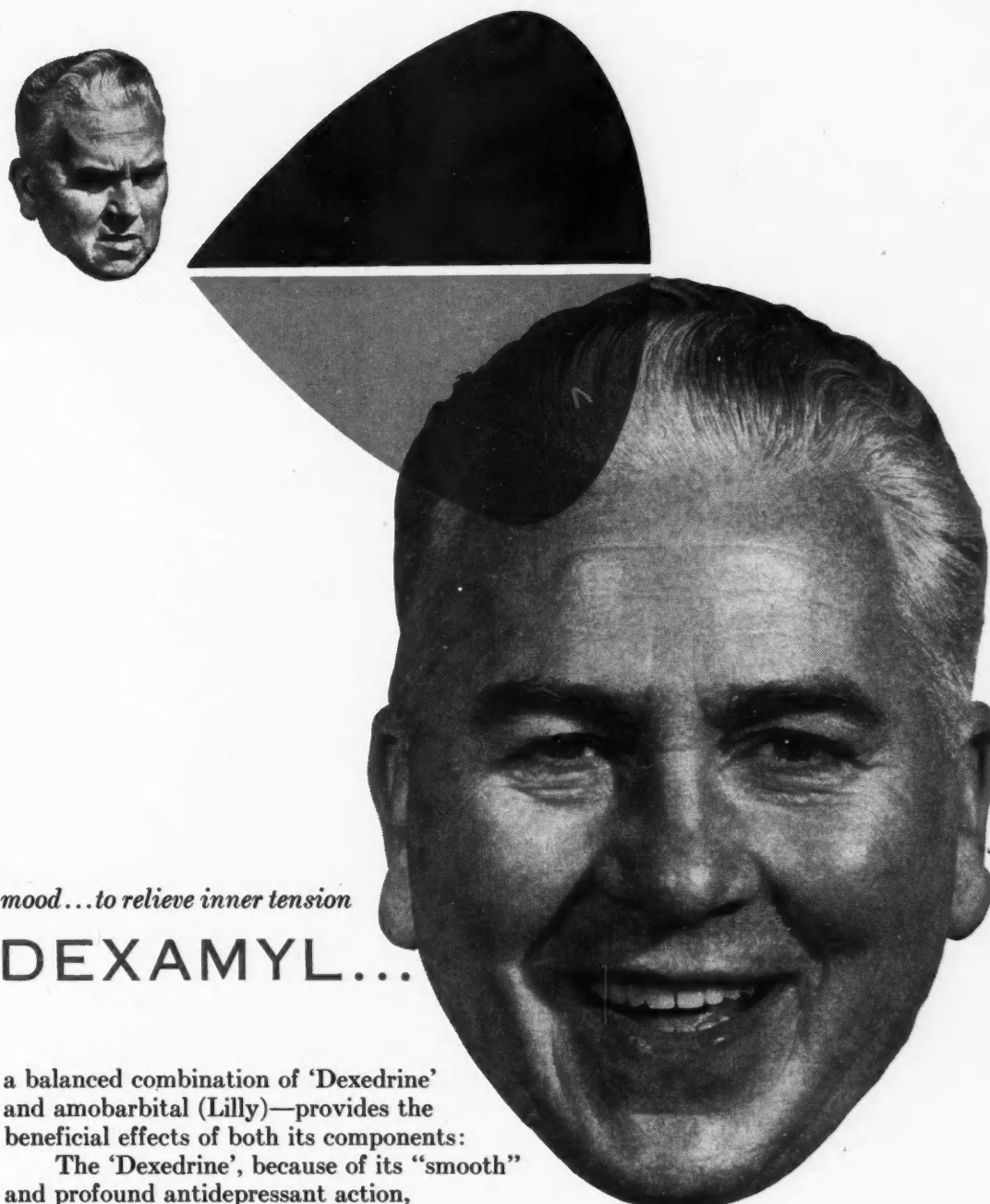
cale souffriraient beaucoup si les plaintes étaient gardées trop longtemps par les comités sans que les plaignants reçoivent au moins un rapport à leur sujet. Nous suggérons que les comités se réunissent souvent et qu'ils règlent rapidement même un petit nombre de plaintes plutôt que d'attendre d'en avoir plusieurs.

Le public sera naturellement intéressé à connaître le travail des comités. A la fin de la première année, ce sera peut-être une très bonne idée pour les comités de rédiger un rapport de leurs activités et de le soumettre aux journaux. Un tel rapport pourrait indiquer les cas soumis en omettant les noms, et donner un compte-rendu.

Action dans les deux sens. Nous avons mentionné précédemment le rôle des comités pour faire cesser les rumeurs. Il existe un autre facteur important par lequel les comités peuvent améliorer les relations entre les médecins et patients. Comme ces comités acceptent de recevoir des plaintes—they devraient aussi avoir le droit équivalent de soumettre des griefs concernant le public. De tels problèmes comme les appels inutiles la nuit, l'attitude injuste des patients à l'égard de la valeur des services médicaux, et le besoin pour les patients de réaliser que les médecins ne peuvent pas toujours laisser tomber des engagements antérieurs pour s'occuper immédiatement de leur cas, peuvent être portés à l'attention du public par les comités.

Réponses à quelques questions. "C'est une mauvaise suggestion. Nous aurons sur le dos tous les grincheux et les mécontents du village." Voilà l'opinion au moins d'un médecin. Il a raison un peu et les comités attireront sans doute des mécontents et des grincheux. Mais les médecins sont déjà aux prises avec ces individus et doivent leur répondre seuls. Les comités de grief protégeront les médecins individuellement. De plus, le public ne subira pas seulement un côté des plaintes formulées par les mécontents et les grincheux. Si les médecins peuvent réussir à mériter la confiance de ces derniers en s'occupant justement et sincèrement de leur grief, le temps des comités ne sera pas employé en vain dans plusieurs cas.

"Pourquoi seuls les médecins organisent des comités de grief? Les vendeurs d'essence ou les menuisiers par exemple n'en ont pas. Et pourtant ces gens aussi subissent des plaintes." La différence est très grande. La médecine est une profession tandis que vendre de l'essence ou travailler le bois ne l'est pas. Le public peut facilement formuler des plaintes en cessant tout simplement de recevoir leur service. A moins que les médecins désirent devenir des commerçants, ils doivent donner au public un moyen de formuler des griefs plutôt que de laisser les gens chercher "ailleurs" pour un nouveau médecin. D'ailleurs, l'on ne peut comparer le domaine de la vente des marchandises ou du travail technique avec celui des soins aux malades. Le premier est contrôlé par la concurrence et



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l'autre est administré par des médecins destinés à servir le public. Le public a donc le droit de se plaindre du service médical qu'il reçoit, s'il le désire.

"Mais les avocats sont des professionnels et pourtant ne possèdent aucune forme de comités de grief pour le public". Il existe un bon nombre de Canadiens qui croient que l'Etat devrait diriger nos services médicaux plutôt que la profession elle-même. Peut-être parce que le travail des avocats ne touche pas directement à la vie de chaque individu, une telle attitude de la part du public n'existe pas actuellement à l'égard de leur profession. En Angleterre où existe la médecine d'Etat, des tribunaux spéciaux et des rapports publiés dans les journaux offrent un libre cours aux patients qui désirent formuler des plaintes. Cela pourrait arriver au Canada. C'est donc en offrant une meilleure alternative aux Canadiens que la profession médicale dans ce pays pourra éviter de se voir imposer la médecine d'Etat. Les comités de grief sont une part importante de cette alternative.

Book Reviews

Bone and Joint Diseases—Pathology Correlated with Roentgenological and Clinical Features. J. V. Luck, Assistant Clinical Professor of Orthopaedic Surgery, University of Southern California. 614 pp., illust. \$19.75. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1950.

This is a unique book on the subject, and has taken the author ten years in preparation. The conception of correlating pathology with radiology and clinical features is excellent, and the illustrations carrying this idea throughout the book are of an exceptionally high order. The text itself is clear and the classifications are simple, straight forward and complete. Where the author disagrees with a generally accepted classification he gives the reasons for altering them. The phraseology throughout the book is clear and the only portion that is somewhat difficult to follow is the author's description of bone itself. Here he soon gets lost in the technicalities of the structure. But apart from this very minor deficiency it is readable and pleasant to study, as well as being extremely interesting, both from the pathological point of view, the radiological and clinical.

One minor criticism is in the section Reaction of Bone to Metals. Here only a page is devoted to this important subject, and future editions could make more of this. All of the subjects are dealt with in a masterly fashion. The special chapters on Bone Structure, Infection, the Arthritides, and Bone Tumours are extremely helpful from every point of view. The special chapter on Osseous Lesions in the Reticulo-Endothelioses is also a very helpful essay, including many diseases and varying them conveniently with clear photomicrographs and radiographic reproductions. At the end of each chapter there is a thorough bibliography. This volume is an important landmark in bone and joint disease, and can be highly recommended to the general surgeon who does occasional orthopaedic or traumatic surgery, the orthopaedic surgeon, and the radiologist and pathologist.

Therapeutics in Internal Medicine. Edited by F. A. Kyser, Associate in Medicine, Northwestern University Medical School, Chicago. 715 pp. \$12.00. Thomas Nelson & Sons, New York, N.Y., 1950.

This volume deals only with therapy and there is little attempt at summarizing symptoms, signs, or diagnosis.

This adds to the efficiency of the text. A complete classification of the diseases in internal medicine is provided and excellent coverage of the material is thus presented. The empirical therapy of the past has been omitted. However, it is only as up to date as one would expect a textbook of therapeutics to be in this era of rapid progress in antibiotic and endocrine therapy. On the other hand there is little in this book which cannot be found in a recently edited standard textbook of Internal Medicine. Although found wanting in some departments such as the effects of the electrolytes on the heart, this text should prove to be a ready guide to practitioners. There is liberal discussion of such recently used drugs as ACTH, cortisone, aureomycin, 'tween 80, terramycin, paradione, phenurone, thromboplastin, choline and others of like importance. All in all, an excellent compilation and review of recent advances in therapy, recommended for students and practitioners.

Personality and its Deviations. G. H. Stevenson, Professor of Psychiatry, University of Western Ontario; L. E. Neal, Assistant Professor of Psychiatry, University of Western Ontario. 362 pp. \$4.00. Charles C. Thomas, Springfield, Illinois; The Ryerson Press, Toronto, 1950.

The text of this second edition appears to be identical with the first, except that the "Related Reading" listed at the end of each chapter has been somewhat expanded. In general, one can say that this volume is a useful introduction to psychiatry. It embraces more than the title implies, and contains a considerable amount of clinical psychiatry, psychology, mental hygiene and other subjects. It is inclined to be rather descriptive in its approach, and in this regard it is to a certain extent out of line with our modern psychodynamic concepts; however, this may well be a virtue rather than a fault. It is a true Canadian book and it is encouraging to see a number of Canadian authors listed in the bibliographies. The reviewer would dispute a number of the statements in the book, and as an example the section on page 291 might be chosen, where the author states—"The authors likewise deprecate the use of the term 'psychosis' to indicate a serious mental illness. They think this term should be regarded as archaic and misleading and a hindrance to the better understanding of mental medicine. They suggest, therefore, that all mental illnesses be broadly divided into delirious conditions and non-delirious conditions. They believe there is no essential difference between a delirium and the psychiatric term 'psychosis'." Such a confusion of reasonably well established terms is not to be encouraged. The book suffers greatly by not containing an index.

Pædiatric X-ray Diagnosis. J. Caffey, Professor of Clinical Pædiatrics, College of Physicians and Surgeons, Columbia University. 862 pp., illust., 2nd ed. \$22.50. The Year Book Publishers, Inc., Chicago, Ill., 1950.

The appearance of a new edition of this comprehensive work should be welcomed by all students of x-ray diagnosis and pædiatrics. Many new subjects are introduced and old subjects are more thoroughly discussed. Among the new subjects are prenatal depression of the skull, external deformities of the thoracic wall, internal surface of the normal thoracic wall, fetal aspiration and ingestion, pulmonary histoplasmosis, meconium peritonitis, meconium ileus, new tables for skeletal maturation, cortical defects in tubular bones, nutrient foramen of the distal femoral epiphysis, Ellis-Creveld syndrome, Pyle's disease, Engelmann's disease, infantile cortical hyperostosis and hypervitaminosis A. Several sections are re-written entirely or in part. These include cephalhæmatoma, fractures of the calvarium, cerebral toxoplasmosis, infantile subdural hæmatoma, primary pulmonary tuberculosis, thymus and sudden death, congenital malformation of the heart, hypertrophic pyloric stenosis, congenital obstructions of the alimentary tract, megacolon, hydrometrocolpos, calcification of the adrenals and others.

Doctor—here are facts on canned peas for your food file



Peas

Nutritive value in average* serving of canned peas

Nutrient	Quantity†	Percentage of Daily Recommended Allowance‡	
		(a)	(b)
Food Energy.....	55 calories	2	2
Protein.....	3.3 gm.	6	5
Calcium.....	0.014 gm.	..	..
Phosphorus.....	0.079 gm.	..	..
Iron.....	1.2 mg.	10	20
Vitamin A.....	380 I.U.	8	7
Thiamin.....	0.11 mg.	14	12
Riboflavin.....	0.06 mg.	6	5
Niacin.....	0.9 mg.	11	10
Vitamin C.....	9 mg.	30	30

* 1/2 cup (100 grams). † Table of Food Values Recommended for Use in Canada, Nutrition Division, Department of National Health and Welfare. ‡ Percentage based on maintenance allowance, Canadian Dietary Standard 1946 for (a) 120 lb., moderately active woman (b) 160 lb. moderately active man.

This information is presented so that your secretary may clip it for your abstract file.



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The author has continued to write in a style readily comprehensible and the many illustrations are excellently reproduced. This book is not only a great asset to the radiologist but should be of great value to the pediatrician.

Pharmacological Basis of Penicillin Therapy. K. H. Beyer, Director of Pharmacological Research, The Medical Research Division, Sharp & Dohme, Inc., Glenolden, Pennsylvania. 214 pp. \$5.75. Charles C. Thomas, Springfield, Illinois; The Ryerson Press, Toronto, 1950.

The first two chapters of this monograph deal with the basic pharmacology pertaining to the absorption, distribution and inactivations of the antibiotic, and the third its mode of action. Subsequent chapters discuss elimination of the drug by the kidneys and especially inhibitions of excretion by carinamide and allied compounds. The final chapter and addendum deals with the pharmacological characteristics of benemid which is particularly useful in oral penicillin therapy. That this timely review is overdue is borne out by the fact that in 1948 the combined sales of penicillin and streptomycin were 60% of the total dollar sales of medicine in the U.S.A. The book contains numerous illustrations and a good bibliography. It should be of interest to both clinicians and pharmacologists.

The Oesophagus and Pharynx in Action. W. Lerche, Fellow American College of Surgeons. 222 pp., illust. \$6.50. Charles C. Thomas, Springfield, Illinois; The Ryerson Press, Toronto, 1950.

It is gratifying that the publishers of this book have realized the growing need for monographs on investigative subjects in Medicine. The immense volume of material being submitted to journals has completely pushed the discursive and exhaustive treatise aside in favour of the short curtailed article. This is as it should be, but it has deprived investigators of the opportunity of presenting in one place and at one time their accumulated findings concerning a single subject. The present publication is another in the series of medical monographs which Messrs. Thomas have given us in response to this need. The author has studied minutely a large series of post mortem specimens of the pharynx and oesophagus. Since varying segments were in a state of contraction at the time of examination, he has been able to synthesize the sequence of events which occur both on deglutition and upon regurgitation, and to deduce the function of the various sphincters. This information, together with a careful analysis of the literature is presented here. The volume is beautifully illustrated both with diagrams and photographs. This is, of course, a highly specialized and technical monograph directed specifically at those interested in specialized knowledge of the oesophagus and pharynx.

Methods in Medicine. G. R. Herrmann, Professor of Medicine, University of Texas Medical Branch at Galveston. 488 pp., 2nd ed. \$8.25. The C. V. Mosby Co., St. Louis, Mo.; McAinsh & Co. Ltd., Toronto, 1950.

This is a completely revised edition of the Manual of the Medical Service of Dr. George Dock, published in 1924. Much new information has accumulated since then and the author has taken good advantage of the opportunity to embody it in this rewriting. It is planned as a practical ward or bedside guide for the clinical investigation of common as well as some of the rarer diseases. It is concise and at the same time comprehensive, so that it may be accepted as a guide to the investigation and treatment of an individual case as well as a reference in the whole science of internal medicine.

The text is divided into five parts dealing in turn with methods of routine case study, clinical laboratory procedures and tests, methods of clinical investigation, therapeutic methods particularly emergency case study and handling and dietetic methods. The book is addressed to the intern, the resident and the practising physician,

who will find in it the necessary methods that will help in solving many of their medical diagnostic and therapeutic problems.

The Neurologic Examination. R. N. DeJong, Professor of Neurology and Chairman of the Department of Neurology, University of Michigan Medical School. 1079 pp., illust. \$15.00. Paul B. Hoeber, Inc., Medical Book Department of Harper & Brothers, New York, 1950.

The reviewer considers the practical value of this 6 lb. book as doubtful. The author limits himself, as his title states, to the examination of the nervous system in such detail as to be unsuitable for the need of the undergraduate. On the other hand, it appears to contain insufficient new material to be of value to the specialist as a reference book. Its main value will probably be on the shelves of hospital libraries as a guide to interns. The book is well illustrated.

Factors Regulating Blood Pressure. Transactions of the Third Conference, May 5-6, 1949. Edited by B. W. Zweifach and E. Shorr, Department of Medicine, Cornell University Medical College. 280 pp., illust. \$2.55. Published by the Josiah Macy, Jr. Foundation, New York, N.Y., 1950.

These transactions make rather difficult reading for one not familiar with current research in haemodynamics. The different topics include: capillary circulation, venous circulation, haemodynamics in hypertension, renal circulation, electrical methods of measurement of blood pressure, congestive heart failure, cardiac output and peripheral vascular adjustment, sympathetic nervous system and hypertension, and cerebral blood flow. A good deal of basic physiology is presented.

Proceedings, First National Conference on Cardiovascular Diseases, 1950. Published June, 1950 by the American Heart Association, New York, in co-operation with the National Heart Institute, U.S. Public Health Service, Federal Security Agency. 259 pp. \$1.75. International Press, New York, 1950.

The National Conference on Cardiovascular Disease lasted 3 days and consisted mainly of committee discussions on 51 different aspects of cardiovascular disease; from congenital heart disease, arrhythmias, heart failure, to the effects of nutrition and industrial hygiene. The plan of the conference was based on research in many fields, but also included such aspects as community service and professional education. An example is that of sub-acute bacterial endocarditis, which was covered in three pages. The etiology was summarized as well as the signs of the disease and the differential diagnosis along with an outline of the current treatment. Prophylaxis and the general direction of future research were set down in heading form. Another example is that of congenital heart disease where the diagnostic points in 15 different heart malformations were summarized. Possible avenues of fruitful research in congenital heart disease were tabulated.

This book should be available to everyone interested in the investigation of cardiovascular disease. It is of interest to anyone planning research in the many aspects covered. It also brings into clearer focus the problem of broad planning in this field.

Virus and Rickettsial Diseases. S. P. Bedson, Professor of Bacteriology, London Hospital; A. W. Downie, Professor of Bacteriology, University of Liverpool; F. O. MacCallum, Director Virus Laboratory, Central Public Health Laboratory; C. H. Stuart-Harris, Professor of Medicine, University of Sheffield. 382 pp., illust. \$4.55. Edward Arnold & Co., London; The Macmillan Co. of Canada Ltd., Toronto, 1950.

This book is a concise presentation of available knowledge about viruses and the diseases they produce. It is well written, easy to read and the arrangement lends itself to easy reference. It begins with general consider-

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ations, immunity, natural history and chemotherapy. Facts are given as such, theories and objections to them are stated and the most likely are discussed. Individual diseases are given greatest space, from psittacosis and smallpox through the common virus diseases like the common cold and hepatitis to those less common here like yellow fever and dengue. The volume ends with a discussion of bacteriophage and laboratory diagnostic procedures. Each disease is discussed from a general point of view, its clinical features mentioned, its cause, the nature of the virus and its laboratory diagnosis, epidemiology, control and treatment. The reviewer cannot comment on the inclusiveness or the accuracy of the laboratory procedures; the clinical discussions are concise; methods of control are well discussed; treatment, where available, is well stated as are the results of treatment; where no treatment is available it is so stated and symptomatic measures are given; the book is up-to-date in its evaluation of antibiotics as therapeutic measures. To the student, to the busy doctor who wants to know more about the virus diseases, which are susceptible to active treatment and what that treatment should be, this book will be valuable and can be recommended.

Thromboembolic Conditions and their Treatment with Anticoagulants. C. D. Marple, Assistant Clinical Professor, Division of Medicine, University of California Medical School, San Francisco, Calif., and I. S. Wright, Professor of Clinical Medicine, Cornell University Medical College. 416 pp., illust. \$10.25. Charles C. Thomas, Springfield, Illinois; The Ryerson Press, Toronto, 1950.

The authors of this book present a concise and convenient summary of the pertinent information collected on this subject during the past few decades. They have covered the biochemical and physiological background and have made a complete survey of the clinical aspects of thromboembolism including technical laboratory methods. The book is largely written as a series of abstracts of published work and the authors have refrained from comment except on subjects in which they have special knowledge.

The authors realize only too well how quickly such a book becomes out of date. The last section of "Recent Developments" has been written immediately prior to publication and contains very recent references. These men have had a wide personal experience in this work and have chosen their subject matter skilfully. This book will serve as a very good reference and should be read by those working in the field. It will prove an excellent medium for rapidly becoming acquainted with a controversial subject about which so much has been written.

The Biology of Human Starvation. A. Keys, J. Brozek, A. Henschel, O. Mickelsen, and H. L. Taylor, with the assistance of E. Simonson, A. S. Skinner and S. M. Wells, of the Laboratory of Physiological Hygiene, School of Public Health, University of Minnesota. Vols. I and II, 763 pp., illust.; and 1385 pp., illust. \$19.75 each. The University of Minnesota Press, Minneapolis, 1950.

This is not simply a textbook or a review of the problem but presents very extensively the authors' own experimental results and experiences gained mainly by the so-called "Minnesota experiment". In the course of this formidable undertaking 36 young and healthy human volunteers were kept in semi-starvation for 24 weeks under rigidly controlled and standardized conditions. Following that in a twelve weeks' period different types of rehabilitation diets were tested on the same subjects. The effects of both starvation and rehabilitation were tested and evaluated in the most elaborate way. The whole is a masterpiece of carefully planned and conducted teamwork and actually unique in its field.

Morphological changes are presented, first in the human body as a whole and then in the different organ systems. Biochemical problems of metabolism are dealt with in the next chapter with an extra section of the important and controversial question of protein and

energy requirements. The next chapter presents the physiology of starvation divided according to organ systems and including the changes in capacity for work. The second volume is devoted mainly to the very important psychological aspects of starvation. Finally special problems of starvation are presented: the edema problem, Anorexia Nervosa and Pituitary Cachexia, Growth and Development, Infectious Diseases and Under-nutrition, Tuberculosis, Diabetes Mellitus and Under-nutrition, Cancer and Other Neoplasms. The book is an invaluable aid for the scientist working in this field, and is also indispensable in clinical medicine where physicians are continually facing problems of starvation secondary to disease.

Practical Gynaecology. W. J. Reich, Attending Gynaecologist, Cook County Hospital; M. J. Nechtow, Associate Attending Gynaecologist, Cook County Hospital. 499 pp., illust. \$12.50. J. B. Lippincott Co., Montreal, 1950.

This book is written primarily for the general practitioner. It will be of invaluable assistance to him especially in office gynaecology. It could be read with profit by all clinicians. The approach to gynaecologic diagnosis is first by a complete examination. Emphasis is placed upon the history, "allowing the patient to talk herself into the diagnosis". This is followed by a "head to toe" physical examination and finally the pelvic examination. The many laboratory tests are detailed in such a way to simplify them for office management. The psycho-somatic problems are handled in a manner that a general physician can understand. Great stress is placed upon the possibility of early diagnosis in malignancy. Endocrinology which plays such a large rôle in this field is very well handled and easily understood.

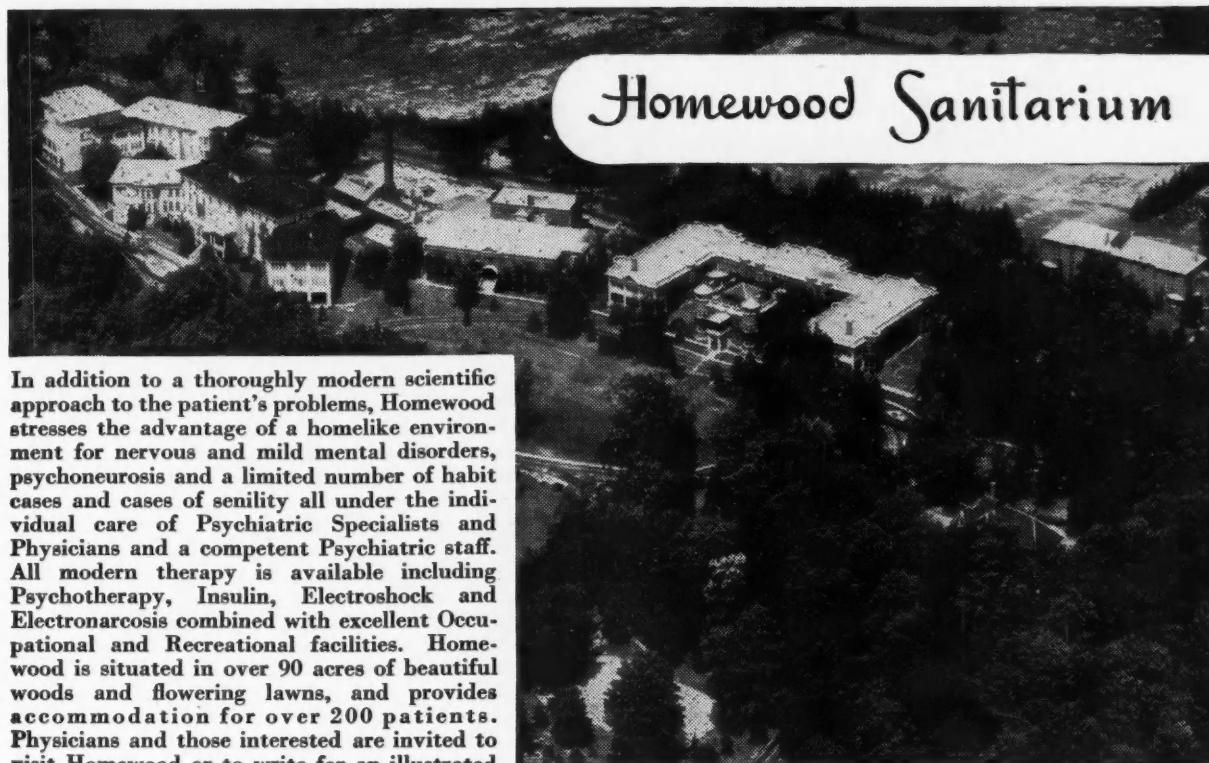
This is an excellent book which cannot be too highly recommended.

A History of English Public Health 1834-1939. W. M. Frazer, Professor of Public Health, University of Liverpool. 498 pp., illust. \$6.75. Baillière, Tindall & Cox, London; The Macmillan Co. of Canada Ltd., Toronto, 1950.

This is the best integrated and most authoritative book on its subject which has yet appeared. In studies of this sort social medicine is at last emerging from the narrower categories of medical history in which public health activities and preventive medicine were treated as rather dry appendages to the story of scientific medicine proper. Dr. Frazer has carried out a difficult task with skill and admirable perspective. In the earlier chapters he outlines the way in which the Industrial Revolution in England sharply forced attention on public hygiene. The cholera epidemics of 1831 and 1848 gave rise to fear which combined with the growing humanitarianism to produce sanitary legislation and social reform along a broad front. This first stage was one of investigation and basic legislation inspired by Chadwick, Southwood Smith and their associates, and the development of vital statistics under men like William Farr.

Dr. Frazer then develops the story in chronological fashion with the turn of the tide in 1870 under Simon's direction, and later the broader development under the impact of bacteriological discoveries. From the turn of the century the prime features have been the growth of the personal health and social services spreading to every phase of society and culminating in the social security legislation and the national health acts which have now brought medicine in Great Britain under the state. The medical reader, the student of history and particularly those interested in the changes which have brought about such a sweeping revolution in the relation between medicine and the state will find in this volume a clear and dispassionate record of the developments of the past century in Great Britain which has been and continues to be the forging-house of social and political reform. Dr. Frazer's book has been well mounted and illustrated. It should be a standard source-book in any public health course.

Continued on page 39



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Books Received

Continued from page 94

Books are acknowledged as received, but in some cases reviews will also be made in later issues.

Medical Neuropathology. I. M. Scheinker Assistant Professor of Neuropathology and Assistant Professor of Neurology, University of Cincinnati College of Medicine, Attending Neurologist, Cincinnati General Hospital, Cincinnati, Ohio. 363 pp., illust. \$12.00. Charles C. Thomas, Springfield, Illinois; The Ryerson Press, Toronto, 1951.

Medicine of the Year 1951. Edited by J. B. Youmans, Dean School of Medicine, Vanderbilt University. 298 pp. \$5.75. J. B. Lippincott Co., Philadelphia, London, and Montreal, 1951.

Hypertension. E. T. Bell, B. J. Clawson and G. E. Fahr. 573 pp., illust. \$8.75. University of Minnesota Press, Minneapolis; Thomas Allen Ltd., Toronto, 1951.

Primary Carcinoma of the Liver. C. Berman, Senior Medical Officer, Consolidated Main Reef Mines and Estate, Ltd., Maraisburg, Transvaal, South Africa. 164 pp., illust. 35s. H. K. Lewis & Co. Ltd., London, 1951.

Electroencephalography in Clinical Practice. R. S. Schwab, Director of the Brain Wave Laboratory, Massachusetts General Hospital, and Associate in Neurology, Howard Medical School. 195 pp., illust. \$7.50. W. B. Saunders Co., Philadelphia; McAinsh & Co. Ltd., Toronto, 1951.

Allergy: Facts and Fancies. S. M. Feinberg, Associate Professor of Medicine, Chief of Section of Allergy and Director of Allergy Research Laboratory, North-Western University Medical School. 173 pp. \$2.50. Harper & Brothers, New York, 1951.

Enzymes and Enzyme Systems. Edited by J. T. Edsall. 146 pp., illust. \$4.50. Harvard University Press, Cambridge, Massachusetts; S. J. Reginald Saunders & Co. Ltd., Toronto, 1951.

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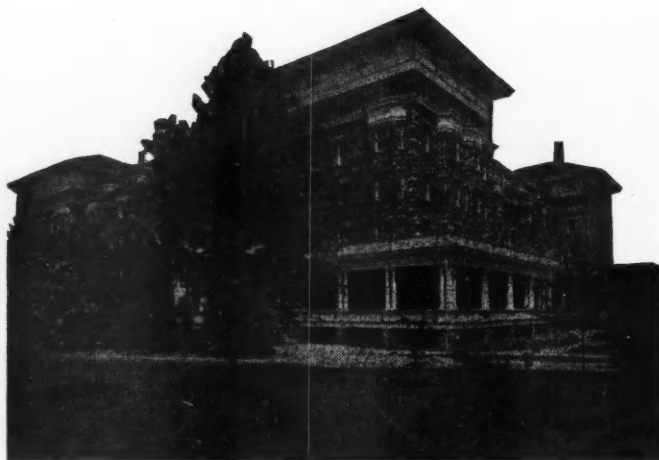
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Books Received

Continued from page 39

Syllabus of Human Neoplasms. R. M. Mulligan, Professor of Pathology in the University of Colorado School of Medicine. 317 pp., illust. \$9.00. Lea & Febiger, Philadelphia; The Macmillan Co. of Canada Ltd., Toronto, 1951.

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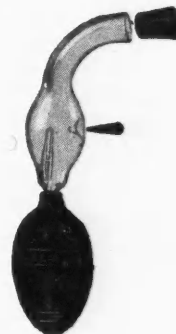
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Thirty Years Ago . . .

From the *Journal* of July, 1921

MEDICAL ORGANIZATIONS IN ONTARIO AND THE PRESENT NECESSITY, by J. Heurner Mullin. . . . Let us assume that we represent an intellectual class, and that our chief object in life is to provide a service in the interest of humanity of a highly specialized character.

Discussions regarding any revision of medical practice from the stage of apathy or scorn to a violent and impossible opposition which too often savours of self-interest.

Should we not recognize that during the last two or three generations our plan for medical practice has not kept pace with changes in our social life? It is only fair to ourselves to admit that our plan for service to the community as a whole is incomplete and unsatisfactory in many respects. Some change is absolutely needed in the interest of the whole public body and is already at our doors.

. . . "State Medicine" as we know today should rather be considered as a threat, not a solution, indicating what will happen to our profession if we quietly sit by and watch the activities of those who are outside our ranks; who without our aid, will surely establish some system which is unsound in principle and can never give complete satisfaction in practice. . . . Under any system the aim must be to ensure to every individual in the community a satisfactory medical service, without requiring him in time of great distress to accept charity or go into debt. . . . We must make provision to elaborate an extensive hospitalization program, which will take into consideration the actual needs in all of our small communities. . . . It may even be necessary in some of our communities to take active measures to re-establish in the public confidence "the doctor of the old school", the Dr. McClure type in "The Bonnie Briar Bush".

. . . A consultant staff will undoubtedly be necessary in many forms of work. These may be developed within the group or may be brought in as occasion demands from a larger centre. Such consultants, either in their communal or private work, should always be ready to render expert service when required by their brethren, and not so completely concerned with commercial advantages as too often we find many of the so-called specialists of today. The buying and selling of patients, otherwise called "fee splitting" is another example of commercial enterprise and should be prevented by some amendment to the Criminal Code. The taking of any part of fees by any system of secret graft, without actual service rendered, and without the knowledge of the patient, should more properly be called "theft".

If the specialist is not too busied with an egotistical appreciation of his own importance, he should

recognize the part which the well-trained general man takes in the community—services more valuable on critical occasions than any money can repay. The honest consultant should use every possible opportunity for assisting the public to properly understand the value of such services, and to pay a reasonable honorarium for the same. . . . Over-specialization has been tried across the border and has been found wanting. The best elements of their public are doing some thinking, and resent having to call in ten or fifteen specialists at once or at various times in order to have efficient routine care of their families in the simplest form of illness.

The six-weeks' specialist, or the bumptious novice, who soon after graduation decides to limit his field to some specialty, has been a serious factor in unsettling the public mind, and prevents their real appreciation of medical progress. His methods are much too common. He applies his various tricks in trade, his unnecessary fire-works, his private clinics to the family circle of the unfortunate patient, his sneers and jibes regarding methods of his neighbours in the profession, and all for the advancement of his personal prestige.

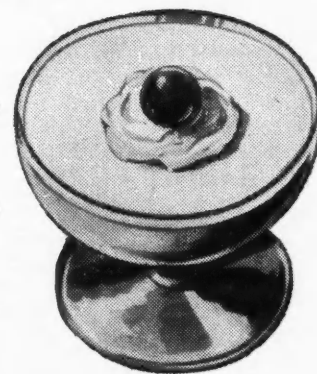
Let the rank and file of our profession stand by and use every possible effort to crush out the existence for all time, any educational program which has for its sole object the creation of such as these.

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